





UNIV.  
C

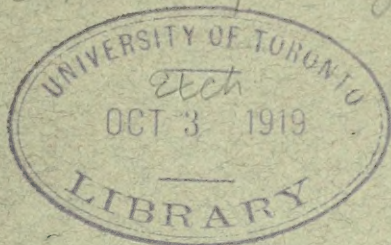
# COLORADO COLLEGE PUBLICATION

GENERAL SERIES NO. 103.

EDUCATION AND PSYCHOLOGY SERIES, Vol. 1, No. 1, Pages 1 to 100.

---

*(Letter of 20/7/20 - 1' was only name found)*



## THE PRESENT STATUS OF PSYCHOLOGY

—By—

JOHN A. MCGEOCH, A. M.

---

COLORADO SPRINGS, COLORADO  
SEPTEMBER, 1919.

Published by Authority of the Board of Trustees of Colorado College  
Every Six Weeks During the Academic Year.

Entered as second-class matter, September 23, 1905, at the Post Office in Colorado Springs,  
Colorado, under Act of Congress of July, 1904.



Editor-in-Chief.....C. A. DUNIWAY, PH. D.

Committee on Publications

{ S. F. BEMIS, PH. D.  
G. K. PATTEE, A. M.  
E. B. POWERS, PH. D.  
C. H. SISAM, PH. D.

---

### SCIENCE SERIES—VOL. XII.

Nos. 1-29 Science Series, 1-4 Social Science Series and 1-14 Language Series, have appeared in *Colorado College Publications*, Vols. 1-10 inclusive. Nos. 1-17 Science Series, 1-3 Social Science Series and 1-9 Language Series are out of print.

- No. 1. The Myxomycetes of Colorado.—*W. C. Sturgis*.  
" 2. Stellar Variability and its Causes.—*F. H. Loud*.  
" 3. On the Transformation of Algebraic Equations, by Erland Samuel Bring (1786).—*Translated and Annotated by Florian Cajori*.  
" 4. A Comparison of Temperatures (1906) Between Colorado Springs and Lake Moraine.—*F. H. Loud*.  
" 5. Meteorological Statistics for 1907.—*F. H. Loud*.  
" 6. The Distribution of Woody Plants in the Pikes Peak Region.—*E. C. Schneider*.  
" 7. A History of the Arithmetical Methods of Approximation to the Roots of Numerical Equations of One Unknown Quantity.—*Florian Cajori*.  
" 8. The Succession of Plant Life on the Gravel Slides in the Vicinity of Pikes Peak.—*E. C. Schneider*.  
" 9. The History of Colorado Mammalogy.—*Edward R. Warren*.  
" 10. The Parasite Fauna of Colorado.—*Maurice C. Hall*.  
" 11. A Guide to the Botanical Literature of the Myxomycetes from 1875 to 1912.—*William C. Sturgis*.  
" 12. The Myxomycetes of Colorado, II.—*W. C. Sturgis*.  
" 13. The Birds of El Paso County, Colorado, I and II.—*Charles E. H. Aiken and Edward R. Warren*.  
" 14. Soil Fertility.—*Guy Wendell Clark*.

### SOCIAL SCIENCE SERIES—VOL. II.

- No. 11. The Present Status and Probable Future of the College in the West.—*William F. Slocum*.  
" 12. The Relation of Scholarship to Partial Self-Support in College.—*Guy Harry Albright*.  
" 13. The Growth of Colorado College.—Edited by *Jessie B. Motten*.  
" 14. Report on College and University Administration. Part I.  
" 15. Report on College and University Administration. Part II.



Digitized by the Internet Archive  
in 2008 with funding from  
Microsoft Corporation



THE PRESENT STATUS OF PSYCHOLOGY.

—By—

JOHN A. McGECH, A. M.

STUDIES IN EDUCATION AND PSYCHOLOGY.

COLORADO COLLEGE.

—Edited by—

J. V. BREITWIESER, Ph. D.

NUMBER ONE

*Colorado Springs,*  
*Colorado.*





## TABLE OF CONTENTS.

	Page
Preface .. .. .	3
Historical .. .. .	5
The Status of Psychology in 1919.....	18
The Sequence of Topics in Elementary Text-books....	54
The Gamma and Delta Psychology Tests.....	70

SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENT FOR THE DEGREE OF MAS-  
TER OF ARTS, COLORADO COLLEGE.

MAY 31, 1919.

JOHN A. McGECH

## PREFACE

The aim of this thesis on *The Present Status of Psychology* has been to review briefly the psychology of the past, and the attempts which have been made to determine its status; to determine by means of a questionnaire to American colleges and universities, and by a general review of the field, the status of psychology at the present time. An analysis of the foremost textbooks on psychology has been made in order to determine the sequence of topics. And finally a series of psychology tests, modeled after the Alpha Army Mental Tests, has been suggested. An exhaustive and minute survey has not been intended, but the effort has rather been to gain a broad survey of the present status and general trend of psychology.

For the suggestion of this subject of investigation the author is indebted to Dr. J. V. Breitwieser and for assistance and advice to both Dr. Breitwieser and Professor Paul V. West; as well as to the Wednesday evening Seminar which has been a never failing source of psychological inspiration. For the errors, fallacies, inaccuracies, and mediocrities, the writer assumes all responsibility. It is his hope that the survey will be of value to students and teachers of psychology.

JOHN A. MCGEOCH,  
Colorado Springs,  
May 31, 1919.





## HISTORICAL.

The course by which psychology has attained to the position of an empirical science has been a difficult one. From the time when man first initiated his vain attempts to solve the riddle of the universe, there have been thinkers who have attempted to discover the ultimate nature of the human consciousness. The efforts began with Anaxagoras and Empedocles, each of whom gave a philosophical answer to the nature of the soul in their theories of the constituent elements of the universe. Socrates, perhaps, had a more nearly scientific insight into the nature of mind than any who preceded and many who came after, but he, too, was primarily a philosopher. His disciple, Plato, added largely to the speculations regarding consciousness, but it remained for Aristotle to add the most permanent contribution of the Greeks. He succeeded in building psychology into a discipline equal to any of his time, and many of his ideas have been echoed by 19th Century psychologists.

These philosophers, with Epicurus, Plotinus, and the other Greeks, sought for the essence of the soul. Their method was *a priori* speculation, and their psychology was, of course, inextricably bound up with their philosophy. During the transition period to modern philosophy there was little psychological speculation, except for Saint Augustine and Thomas Aquinas, both of whom were interested in the mind or soul from the standpoint of their religious systems.

The modern period, of which Hobbes is the first notable thinker, shows a marked advance, altho there is much in the thinking of the period that has been derived from Aristotle. The definite beginning of the modern empirical attitude in psychology is disputed. Some rank

Descartes as its founder, which would place its historical origin in the first half of the 17th Century. Others consider Locke, with his emphasis on the inner ideas, as its founder, which would place the date of origin near the end of the latter half of the same century.

After Locke came Berkeley with his *Essay toward a New Theory of Vision*, and Hume with his *Treatise on Human Nature*. The Frenchmen, Bonnett and Condillac, contributed to the psychology of sensation and perception. Herbart contributed his spiritual emphasis. Mill and Bain proposed the association of ideas theory. Even up to this time, however, the whole underlying attitude toward psychology had been the attitude of metaphysical speculation. Mind had been investigated largely in the hope of building support or refutation for some particular philosophical system, or some religious belief. Where this was not so strikingly true, as in the case of Mill and Bain, the *a priori* method could give no greater validity to the conclusions than could be claimed for any metaphysical speculations.

With the introduction of the biological viewpoint and the stressing of the inductive method psychology became more nearly empirical. Spencer was the leader in this application of biological principles and methods to psychology. After him came Lotze with the theory of local sign and intuitional space perception. Next Weber and Fechner showed conclusively that the working of mental processes could be exactly measured; that they are, like other manifestations of nature, uniform and fixed; and that they may conform to laws that can be mathematically expressed. Since the time of Lotze, Weber and Fechner the idea of an experimental psychology has been more definitely formulated. The physicist, Helmholtz, working on vision and audition, gave a greater impetus to experimentation. Hering, the phy-



siologist, brought the findings of physiology to bear upon the problems of psychology and modern physiological psychology was begun. Other experiments, mainly in sensation, were carried on by physicists and physiologists, contributing widely to the field of psychology and bringing it nearer to the full rank of an experimental science.

The first experimental psychology laboratory was that of Wilhelm Wundt, at Leipzig. Other laboratories were rapidly begun in several German universities and from that time interest in the experimental study of conscious phenomena has been steadily increasing.

In this way psychology has come from Democritus down thru the philosophies of Greece, Rome, and the Europe of the Middle Ages, remaining still a branch of philosophy until comparatively modern times. Its present status is the result of the common heritage of all modern science—the experimental method and critical interpretation of results. It is to physics, biology and physiology that psychology is most indebted, and in common with these it owes most to the idea of evolution which has so effectively furnished the key to numbers of the seeming mysteries of mental activity. (1, 2, 3, 4, 5).

Although the beginning of experimental psychology was made by German thinkers, it has remained for American scientists to further develop its possibilities and place it on the firm basis of a natural science. The modern experimental attitude was introduced into America primarily thru two men. William James, bringing in from physiology the experimental viewpoint, is one. Wundt, training American students in his laboratories at Leipzig, is the other. James' great contribution has consisted in his relating and clarifying and applying experimental results. His broad viewpoint and keen scientific insight, coupled with his forceful style of writing,

enabled him to put the results of his experimentation and thinking before the scientific world so clearly that much of his psychology has never been improved upon. He justly stands as the father of American psychology in its broadest sense.

The impetus toward the more technical experimental work came, however, from Wundt's laboratory at Leipzig. G. Stanley Hall and J. McK. Cattell, returning from Leipzig, founded the first experimental laboratory in America at Johns Hopkins in 1883-84. From this as a center interest in experimental work has rapidly spread, until at the present time no college equipment is considered complete without its psychology laboratory. Since the founding of the Johns Hopkins laboratory, three attempts have been made to take a census of the status of American psychology as a college subject. The progress of psychology in the academic world can best be indicated by a brief review of the findings of these attempts.

The first census of psychology, particularly of the experimental side, was made in 1891 by W. O. Krohn, Professor of Psychology at the University of Illinois. His published report covers 17 American colleges and universities, and includes the following, all of which were equipped at that time with experimental laboratories: Harvard, Brown, Catholic University of America, Chicago, Clarke, Columbia, Cornell, Dennison, Illinois, Indiana, Iowa, Leland Stanford, Nebraska, University of Pennsylvania, Wellesley, Wisconsin, and Yale. Krohn tabulates the apparatus of these laboratories, most of which were thoroughly equipped. In the greater number of their general psychology courses James, either the *Briefer Course* or the *Principles*, was the textbook used. (5)

Three years later E. B. Delabarre published statistics for 27 colleges and universities in the *L'Année Psychologique*. He reports the activities of these laboratories as follows: ten were devoted to teaching and original investigation; nine to teaching and demonstration; eight primarily to research. He spoke in glowing terms of the prospects of psychology, and reported that the number of laboratories was rapidly increasing, and those already established were steadily increasing their equipment. On the whole he considered that psychology was in a state of rapid and progressive evolution. (6)

The next important attempt to discover the status of psychology in America was made by Titchener and Ruckmich in 1911-12. In March, 1911, Titchener sent out a questionnaire with a view to getting together material for an article on the present status of psychology. He received 39 replies, but much of the information received was either confidential or too unsystematic to enable its being used, and his intended article was never written. A tabulation of the questions sent out will convey the scope of his intention, and may incidentally throw some light on the reasons for the incompleteness of the replies received.

1. When was the psychology laboratory established?
2. Who was placed in charge? With what academic title?
3. Was the introductory course in psychology, (General psychology or elementary psychology), assigned at the above date to the experimental psychologist? If not, what department had charge of it?
4. Was the course independent, or was it offered in connection with (or in dependence upon) other specified courses?
5. What, in these two respects, is the present status of the introductory course?
6. With the establishment of the laboratory was the department of psychology recognized as independent, or was it



subordinated to some other department or division? In the latter event, what was its precise relation to the superior department?

7. What, in this respect, is the present status of the department?

REPLIES TO THE LAST TWO TO BE TREATED AS CONFIDENTIAL.

8. Are there any important events in the history of the department, (dismissals, readjustments, etc) that illustrate or supplement your replies to the preceding questions?
9. What is your judgment of the present status of the department of Psychology in your university?

The available material which Titchener received in answer to this questionnaire is largely utilized by Ruckmich in his article in the *American Journal of Psychology*. (7) In addition to the material gathered by Titchener, Ruckmich made an investigation of the catalogs of the colleges which had replied to Titchener, and in that way collected more comparative data. In his synopsis of the statistics there will be noticed some differences from Krohn's report, (5) notably that Krohn does not include Michigan in his list, and cites Brown as lying within the period before 1891, while Ruckmich's statistics place Brown in 1892. The discrepancies are not important, however. This list places Harvard at the head and gives its date of founding in 1874-76. The Johns Hopkins laboratory is usually given precedence, since, it has influenced the spread of the experimental work much more than the Harvard laboratory. The tabulation of these 39 colleges with time of establishment of the laboratory and the name of the man then in charge is illuminating, and since it is representative of both eastern and western institutions gives a good idea of the rate of increase of laboratories in the United States.

COLLEGE	TIME	IN CHARGE
Harvard ..	74-76	James
Hopkins ..	83-84	Hall
Indiana ..	88	Bryan
Wisconsin ..	88	Jastrow
Clarke ..	89	Sanford
Nebraska ..	90	Wolfe
Michigan ..	90	Tufts
Iowa ..	90	Patrick
Columbia ..	90	Cattell
Cornell ..	91	F. Angell
Wellesley ..	91	Calkins
Brown ..	92	Delabarre
Illinois ..	92	Krohn
Kansas ..	92	Templin
Chicago ..	93	Strong
Princeton ..	93	Baldwin
Yale ..	93	Scripture
Minnesota ..	93	J. Angell
Wesleyan ..	94	Shaw
Smith ..	95	Smith
California ..	96	Stratton
Ohio State ..	97	Wissler
Bryn Mawr ..	98	Leuba
Texas ..	98	
Missouri ..	00	Meyer
Northwestern ..	00	Scott
Wyoming ..	00	Downey
Washington ..	01	Colgrove
Colorado ..	01	Libby
Cincinnati ..	01	Judd
Mt. Holyoke ..	02	Thompson
Tennessee ..	02	Breese
Vassar ..	03-04	Washburn
Bowdoin ..	04	Burnett
Montana ..	09	Book
Tufts ..	10	Scott
Dartmouth ..	11	Bingham
Vermont ..		
Amherst ..		

The questionnaire showed that 18 institutions still had their psychology closely affiliated with philosophy or some other subject while 21 had their courses independent. In the schools with separate departments no complaints were made regarding conditions, except that in a few instances the psychologists were teaching education and making poor work of it. In half of those affiliated with philosophy the complaint was made that students taking psychology were obliged to take philosophy also. They tended to fall, then, into a philosophizing attitude which worked havoc with their interest in empirical psychology. In some institutions the philosophy courses were required and psychology was only elective. In a few, old-fashioned pedagogical tendencies demanded a primitive and outworn type of psychology to be taught in their courses. Three institutions replied that they would rather the psychology were linked with biology than with philosophy. Wherever the relations were pleasant, in the departments affiliated with philosophy, a tendency was reported to teach the old, non-empirical, generalizing type of psychology. The departments that wished to make psychology strictly empirical found the alliance with philosophy a handicap.

The second part of Ruckmich's study had to do with the standing of psychology as a college subject compared with five other well-organized college courses. This gives a good view of the relative standing of psychology. For comparison physics was chosen because it is an empirical science and bears a traditional relation to the old mental science; political economy because it was established as an academic discipline at about the same time as psychology; education because of its historical and present connection with psychology, as well as its comparative youth. Because physiology is not definitely marked off



from anatomy and medicine, zoology was chosen in its place; philosophy, because it ranks as the parent of psychology. These were compared with respect to the number of teachers in the departments and the number of semester hours offered in the different subjects.

The results show the following comparative standings:

SUBJECT	INSTRUCTORS	HOURS OFFERED
Physics .....	265 .....	2740
Zoology .....	175.5 .....	1944
Political Economy .....	175 .....	3009
Philosophy ..	123.5 .....	1671
Education ..	102 .....	1392
Psychology ..	88.5 .....	1190

These figures are for 19 institutions only. In comparative per cents. of distribution they stand—political economy .286, physics .255, philosophy .133, education .132, psychology .110, zoology .084.

For the same 19 institutions a comparison of the expenditures made for the different departments was gathered, and the comparative per cent. of distribution is again unfavorable to psychology. The comparative per cent. for the same schools is as follows: physics .240, education .210, political economy .191, philosophy .102, psychology .082.

Ruckmich's investigations taken as a whole, psychology seems to foot the list, while political economy, which is of almost the same age, stands at the head in number of hours offered, and well toward the top in the other comparisons. In the comparison of appropriations, education, youngest of all, is second, with political economy third. Psychology again is last. In a comparison of the registration of students which he also reports, political economy is first, and psychology next to last.

From the results of these researches it would seem that after 25 years of growth psychology does not rank with other college and university subjects of comparative and kindred relation. Ruckmich gives in conclusion several reasons to account for this:

1. Pure sciences without definite aim at application are usually slow of academic growth at the beginning of their establishment, e. g., astronomy, zoology, botany, geology.

2. The hardships of progress are emphasized when a subject is trying to gain credit in the world at large and in the academic world at the same time.

3. The establishment of laboratories is slow on account of the expense involved. This may explain the fact that the per capita expenditure for psychology is about the same as for philosophy, which is a non-laboratory subject.

4. The introspective method may offer hindrances on account of the idea that it requires an abnormality of some kind, or else years of toilsome training.

In 1916 Ruckmich published another investigation into the status of psychology, having to do principally with the decade that had just closed. (8)

He begins by remarking that criticisms have been coming from within and from without psychology, and from many sides adverse comments have been made. Philosophers have said, "The present is a strange and troubled time for psychology." (9) And that psychology will be obliged "to revise its scale of values, shift its emphasis and direction of progress, and enter into relations of better understanding and co-operation with philosophy or accept as its portion a distinct subject matter and move in the direction of increased isolation from human affairs and the remaining

body of scientific knowledge." (10) Such criticisms have not been from philosophers only. Even psychologists themselves have criticised their own discipline, as for instance in the words of Watson, psychology "has failed signally during the fifty odd years of its existence as an experimental discipline to make its place in the world as an undisputed natural science." (11)

With these criticisms as a background Ruckmich investigated the field of psychological literature to the end of gaining some idea of the scope and method of accomplishment of the decade. His review covered six American psychological periodicals—*American Journal of Psychology*, *Psychological Review*, *Psychological Bulletin*, *Psychological Monograph*, *Archives of Psychology*, *Journal of Psychology*, *Psychology and Scientific Methods* together with the psychological numbers of the California Studies. He analyzed over 800 articles covering over 20,000 pages. One fourth of the total dealt with method, apparatus, technique, and general matters. Sensation and perception ranked next in number of pages covered, with a total of one fifth of the whole number. Within the group vision ranked highest with auditory next. In eleven years not an article had appeared on taste or smell. Problems in which the subject of consciousness figured largely were prominent. Speculative articles have disappeared since 1913, until it is impossible to find one in the psychological periodicals. One twentieth of the total was devoted to feeling and emotion; a little less than one tenth to motor phenomena and volition. Nearly one fifth was given to attention, memory and thought; the emphasis being on examinations of judgment, belief and reasoning. "Comparison, abstraction, ideation, the psychology of testimony, the diagnosis of mental situation, disorders of attention, memory

and thought stand at the bottom of the list." Attitudes and intellectual activities occupy one tenth of the space. Special mental conditions, sleeping, dreaming, effects of ether, and other drugs on consciousness hold one twentieth of the space, and showed a decline in the last few years of the decade. Also during the decade several psychological magazines were founded—*The Journal of Educational Psychology*, *Journal of Animal Behavior*, *Monograph Series*, *Journal of Religious Psychology*, *Psychological Clinic*, *Journal of Abnormal Psychology*; together with others which were virtually products of the same period.

During the period the introspective method contributed most, there being nearly two and one half as many introspective as non-introspective articles. The review shows an advance in large contributions in sensation, perception, and memory, in journals founded, in the increase of experimental laboratories; with a decline in experimentation with thought consciousness and attentive consciousness, and a passing of speculative articles. Ruckmich closes the survey with the statement, "In both phases of our problem," (accomplishment and method) "it is extremely difficult, if not impossible, to find a single decadent tendency."

#### SUMMARY.

The surveys show that psychology is increasing in the number of experimental laboratories, in the extent and scope of its contributions and general interests; but that it has not yet attained equal rank as an academic discipline with other academic subjects of equal age.

This is the essence of the surveys above quoted, bringing the situation down to the end of 1915. It now remains to discuss the present situation.

(1) Klemm; *A History of Psychology*; N. Y.; Scribners; 1914.



- (2) Rand; *The Classical Psychologists*; N. Y.; Houghton, Mifflin Co.; 1912.
- (3) Rogers; *A Student's History of Philosophy*; N. Y.; Macmillan; 1913.
- (4) Ebbinghaus, Hermann; *Abriss der Psychologie*; Trans. by M. Meyer; N. Y.; Heath; 1908.
- (5) Schwegler, Albert; *A History of Philosophy*; N. Y.; Appleton; 1902.
- (6) Krohn; *Facilities in Experimental Psychology in the Colleges of the United States*; Report of the Commission on Education, 1891.
- (7) Delabarre; *Les laboratoires de psychologie en Amerique*; *L'Année Psychologique*; 1894; 1; 209-255.
- (8) Ruckmich; *History of Psychology in America*; *Amer. J. of Psychol.*; Oct.; 1912; 28; 517-531.
- (9) Ruckmich, C. A.; *The Last Decade of Psychology in Review*; *Psychol. Bull.* 1916; 13; 109-120.
- (10) Jones, A. H.; *The Method of Psychology*; *J. of Phil., Psychol.*; 1915; 12, 462.
- (11) Bode, B. H.; *The Method of Introspection*; *J. of Phil. Psychol.*; 1913; 10, 91.
- (12) Watson, J. B.; *Psychology as the Behaviorist Views It*; *Psychol. Rev.*; 1913; 20, 163.

## THE STATUS OF PSYCHOLOGY IN 1919.

The history of the growth of psychology has been briefly traced, together with the efforts which have been most recently made to discover the standing of the subject as an academic discipline. These have all revealed a steady progress, although there are many evidences that psychology has not yet attained to the general recognition as a natural science with the other natural sciences which it deserves. Having these facts in mind, it was determined to prepare a questionnaire to be sent to a large number of representative American colleges and universities, with a view to getting more data on the present status of psychology, with respect to the number of independent departments, the affiliation of the dependent departments, courses given, students enrolled, number of experimental laboratories, apparatus, and number of teachers in the departments. It was thought that such a questionnaire would give valuable information on several phases of the present standing of psychology in the higher institutions of America.

This questionnaire was sent out in March, 1919. A complete list of the questions follows. This will throw initial light on the purpose and scope of the investigation.

1. Do you have a psychology laboratory?
2. When was the laboratory established?
3. Who is in charge of the laboratory? Title? Degrees?
4. Do you give a course in Experimental Education? Is the Experimental Education laboratory separate from the Experimental Psychology Laboratory?
5. Give the number of semester hours offered in the following:  
General Psychology      Experimental Psychology  
Social Psychology      Physiological Psychology  
Animal Behavior      Name and hours of other courses
6. How many students are now enrolled in your Psychology courses? How many are majoring in Psychology?

7. What text is used in general Psychology? In laboratory work?
8. Is the Psychology department independent? If not, with what department is it affiliated?
9. Do you have the exclusive use of a shop?
10. Of what standing must a student be before he can enter Psychology classes?
11. Enclose a printed list of apparatus, if available. If not, check in the following list the instruments included in your laboratory equipment:

Acoumeter	Lenses
Algometer	Metronome
Brain specimens	Pneumograph
Brain models	Projection apparatus for slides
Campimeter or perim- eter	and opaque objects
Chemicals for taste and smell	Resonators
Chronoscope and acces- sories	Rotator
Chronograph	Rotating and balancing plat- form
Colored papers	Skulls
Dissecting instruments	Stereoscope and slides
Dynamometer	Tambour
Ergograph	Telegraph key
Exposure apparatus or tachistoscope	Thermometer
Galton - Edelmann whistle	Tuning forks
Galvanometer	Watch (stop)
Holmgren worsteds of color blindness test	Vision test apparatus
Kymograph	Photometer
	Plethysmograph
	.....
	.....
	.....
	.....

12. Please give the number of men who devote their whole time to teaching Psychology. Part time to Psychology . . . and the rest of the time to what other subject.

A hundred and one replies to this questionnaire have been received, the institutions replying differing in size from Columbia and Harvard on the one hand

to the small college of a few hundred students on the other. The data and discussion of it will be given under paragraphs bearing the number of the question which they concern.

1. The answers to question 1 regarding the possession of a psychology laboratory show a total of 67 out of the 101 institutions as having a psychology laboratory. Nearly all of the 34 not having a regular laboratory checked various pieces of apparatus called for in question 11, showing that although they did not possess a laboratory they nevertheless were prepared to give lecture room demonstrations, and had a nucleus for a laboratory equipment. The fact that two-thirds of the total have a regularly equipped laboratory speaks well for the standing of psychology as an empirical science. That a good proportion of the smaller institutions have provided laboratories indicates that the experimental laboratory is coming to be recognized as an essential part of a college plant, a part which is no longer considered necessary by the larger colleges alone.

2. The second question deals with the date of the founding of the laboratory. The returns are tabulated as to decades:

1880-1890, 3 laboratories established. These were one each in 1888, 1889, 1890.

1890-1900, 17 laboratories established.

1900-1910, 20 laboratories established.

1910-1919, 22 laboratories established.

Five of the institutions having laboratories did not give the date when the laboratories were established. As far as these particular results are concerned, a steady increase in the number of laboratories is shown. The increase, as might be expected, is largest in the second



decade, but increases gradually during the following two. The fact that in the 9 years of the last period the largest number of laboratories have been established is encouraging indication of the advance of psychology as an empirical science. The results can hardly be compared with those of Ruckmich, (7) chap. I, since the two tables do not deal with exactly the same schools. However, the last date which he gives for the establishment of a laboratory is 1911, when the Vermont laboratory was opened. Therefore, the above results, especially those for the last period, give new data on the subject, and throw valuable light on the increase of experimental psychology laboratories.

3. This question, regarding the title of the man in charge of the experimental laboratory and his degrees, was asked in order to discover, if possible, the academic standing of the experimental psychologists, i. e., whether most institutions consider it necessary to have a full professor in charge of the work, or whether it has been usually relegated to an instructor or assistant; likewise what academic standing, with respect to degrees, is usually required of, or possessed by, the man placed in charge. The ranks and degrees of the men at the head of the 67 laboratories reported are:

Professor, 58 institutions.

Associate professor, 2 institutions.

Assistant professor, 7 institutions.

Degrees: A. B., 1; A. M., 8; Ph. D., 56; LL. D., 2.

\*\* Only the highest degree received has been tabulated. The 2 men with LL. D. degree are men having the A. M., but not the Ph. D. The LL. D. is therefore the highest degree, and has been listed.

These results indicate that in the majority of

schools the experimental laboratory is in direct charge of a full professor who has received his Ph. D. degree, which shows that the psychology is considered sufficiently important to be ranked with the other academic disciplines which always have a full professor in charge.

4. Since many colleges have installed equipment for work in experimental education, this question was asked to determine the extent of this work, and its relation to the psychology laboratory work.

Results:

Institutions giving Experimental Education ..	27
Separate from Psychology laboratories ..	8
Not separate from Psychology laboratory.....	16
No data on laboratory relations.....	3
Institutions not giving Experimental Education ..	63
Institutions giving no data at all.....	8

Apparently very few colleges giving courses in Experimental Education have a special education laboratory of their own, much of that work being done in the psychology laboratories. The results show that the application of psychology to education in an experimental way is growing, and gives promise of an increase in value for both psychology and education, since this experimental application will broaden the interest and field of psychology, and at the same time raise education to a more empirical basis, by detaching it from the old philosophical emphasis which has so long hampered it.

5. The replies to question 5 are significant of the breadth of interest in the field of psychology, as well of the diversity of courses that are being offered.

SUBJECT	HOURS	NUMBER OF INSTITUTIONS
General psychology .....	482.....	96
Social psychology .....	175.....	57
Experimental psychology .....	326.....	57
Physiological psychology .....	64.....	16
Educational psychology .....	306.....	51
Animal behavior .....	80.....	25
<hr/>		
Modern literature .....	3.....	1
Business psychology .....	27.....	9
Genetic psychology .....	19.....	7
Psychiatry ..	2.....	1
Human behavior .....	4.....	1
Abnormal psychology .....	54.....	16
Psychology of literature .....	7.....	2
Psychology of religion .....	24.....	9
Psychology of personality ....	3.....	1
Psychology of learning .....	8.....	2
Dynamic psychology .....	3.....	1
History of psychology .....	6.....	2
German psychology .....	4.....	1
Psychology of suggestion ....	3.....	1
Instinct and emotion .....	3.....	1
Applied psychology .....	45.....	11
Clinical psychology .....	11.....	4
Mental hygiene .....	6.....	2

It will be noticed that general psychology leads the others in point of number of hours offered, with experimental ranking second, and educational third. It is significant that so large an amount of work is offered in educational and social psychology, indicating that the application of psychology to education and sociology is rapidly gaining ground. The number of hours offered in experimental psychology is also indicative of the high

value attached to it. The number of hours reported for the experimental psychology are not the number of laboratory hours, but the number of credit hours given. The laboratory hours are, of course, much greater in number. Ten of the institutions having experimental laboratories did not report the number of hours offered in experimentation. It would appear that the physiological and animal behavior phases of psychology are not being emphasized, except in connection with other courses.

The large number of courses reported in the latter part of the tabulated list amply bears out the statement later made that psychology is divided into many strands, and has departed in many divergent lines from the main field. The principal interest, in the courses other than the ones mainly offered, seems to center in abnormal and applied psychology. Just what is usually included in the latter has not been reported in the replies. Education, sociology, or business courses may be included in the term, but courses of that name are offered to the extent of 45 credit hours. The returns certainly show a great diversity of possible courses which are actually being offered in one or more colleges or universities, and indicate some of the lines along which psychology is branching. Whether this diffuse branching of the subject will prove advantageous to the general field of psychology as a science is another matter.

6. Ninety three replied to this question regarding number of students enrolled in psychology courses. The second part of the question as to the number majoring in psychology either was not directly understood by most who replied, or there is no major system effective in their institutions. Only 35 reported number of majors in their department. These reported a total of 503 students majoring in psychology. Taken as a whole, and consid-



ering war conditions, this is not a bad report.

7. A great many of the replies to this question gave two or three textbooks as the ones used in their courses. Each time a text has been mentioned as directly used for a class text it has been counted one. Therefore the total number of the following tabulation exceeds the number of replies to the questionnaire. The books used, together with the number of schools in which they are used are as follows:

TEXTBOOK	TIMES USED	LAB. MANUAL	TIMES USED
Pillsbury .....	37	Titchener .....	14
Angell .....	23	Langfeld and Allfort ..	9
Breese .....	19	Seashore .....	5
Judd .....	8	Breitwieser .....	5
Titchener .....	8	Myers .....	3
James .....	7	Whipple .....	2
Seashore .....	3	Dunlap .....	1
McCosh .....	3	Peterson .....	1
Thorndike .....	2	Sanford .....	1
Stout .....	1	Witmer (analytical) ..	1
Witmer .....	1	Starch .....	1
Munsterburg .....	1	Valentine .....	1
Calkins .....	1		
Hoffding .....	1		
Phillips .....	1		

Comparatively few replied to the question regarding the laboratory manual used, by giving the name of a printed manual. The majority of laboratory directors evidently use their own printed sheets. In those books used there are some which are not distinctly laboratory manuals. Some are really texts and others are manuals for educational experiments. The fact that so few use a regular laboratory manual would seem to indicate that none has yet appeared which has met their needs.

It may likewise indicate the need for a manual more adapted to present experimental conditions. The fault to be found probably with most manuals is that they are not really manuals in the sense that a chemistry laboratory manual is thought of, i. e., as directing and outlining experiments exactly. They are too general and contain so much highly technical and unnecessary material that a concise laboratory sheet is much more adapted to the use of the average student. (Note I.)

The results of the question as to text used in general psychology is highly enlightening with regard to the value attached by teachers of general psychology to the various texts which have appeared in recent years. These results have been used in the following two studies as the basis for comparison of sequence of topics, and for assigning number of questions to the various subjects.

8. This question dealt with the dependence or independence of the psychology departments. Out of the 101 replies, 31 reported that the department was entirely independent, 68 reported dependence on some other department. Two gave no data. Of the 68 dependent departments the affiliation with other departments is as follows:

Affiliated with philosophy .....	38
Affiliated with education .....	15
With both philosophy and education.....	12
With education and sociology .....	1
Affiliated with biology .....	1
Affiliated with Bible .....	1

Note 1.—Breitwieser's laboratory manual, PSYCHOLOGICAL EXPERIMENTS, certainly does not err on the side of excess technical material or material found only in specific laboratories. A revision of this text is under way which will give the student better guidance in table forms and experimental technique.

This would seem to indicate a somewhat discouraging outlook as far as the independence of the psychology departments are concerned. However, when we consider the number of experimental laboratories with full professors in charge, and the number of men giving full time to psychology, not to mention the number giving part time, together with the fact that many departments are affiliated only in name while the work is practically independent, the outlook is probably not as discouraging as it would at first appear. It is not very gratifying to find so many linked up with philosophy, since that is usually attended by too much emphasis on the *a priori* and theoretical side of the subject. However, it is the case in a great many instances, as some of the replies brought out, that the affiliation with philosophy is only in name and for the sake of administrative convenience. The affiliation with education is a hopeful indication, since the application of scientific psychological findings to the field of education has done much to establish the latter as a valuable academic discipline, and has usually been favorable to psychology at the same time. The two affiliations with education and psychology, and with biology, are doubtless indications of a tendency which is apt to increase, viz., the tendency to link psychology with biological or sociological sciences with the emphasis laid on its application and its connection with these fields. The three fields, education, biology, and sociology, are the most promising ones for psychological application, and an affiliation with such departments will doubtless prove vastly more satisfactory than with philosophy.

9. The possession of a shop in connection with the psychology laboratory is, of course, extremely valuable, since experiments are frequently occurring for which apparatus must be built or at least modified. Therefore, the question concerning the exclusive use of a shop in

the psychology department was included in the questionnaire. The results show that 20 of the 67 institutions having laboratories also have the exclusive use of a shop. These 20 were mainly in the larger schools.

10. The tenth question dealt with the academic standing required of a student before admission to psychology course. The results are:

YEAR	NUMBER OF INSTITUTIONS
Freshman ..	11
Sophomore ..	69
Junior ..	15
Senior ..	1

The sophomore year seems to be the time at which most institutions admit students to courses in psychology. The junior year stands next in order, and the freshman third, with only one school requiring students to be of senior standing before admission to courses in psychology.

11. A list of what was considered the most important and fundamental apparatus for the laboratory was prepared and made a part of the questionnaire, it being asked that each school replying, check the apparatus which they had in their laboratory, together with any other important pieces of apparatus not in the list. They are listed below, the number of schools out of the 67 having experimental laboratories listing each piece is tabulated after the name of the piece of apparatus.

NAME OF APPARATUS	NUMBER HAVING IT	NAME OF APPARATUS	NUMBER HAVING IT
Acoumeter ..	35	Kymograph ..	52
Algotometer ..	30	Lenses ..	58
Brain specimens ..	57	Metronome ..	60
Brain models ..	61	Pneumograph ..	43



Campimeter or peri-meter .....	51	Projection apparatus for slides and opaque objects ..	39
Chemicals for taste and smell .....	63	Resonator ..	52
Chronoscope .....	48	Rotator ..	46
Chronograph .....	33	Rotating and balancing platform ..	27
Colored papers .....	66	Skulls ..	36
Dissecting instruments ..	45	Stereoscope and slides..	62
Dynamometer ..	49	Tambour ..	51
Ergograph ..	41	Telegraph key ..	52
Exposure apparatus or tachistoscope ..	54	Thermometer ..	60
Galton-Edelmann whistle ..	44	Tuning forks ..	63
Galvanometer ..	43	Watch (stop) ..	63
Holmgreen worsteds or color blindness tests..	56	Vision test apparatus..	59
		Photometer ..	28
		Plethysmograph ..	45

The other pieces of apparatus most frequently added to the list were mentioned only a few times each. Those added from two to five times are:

Tonoscope	Pseudoscope
Dark room	Sound Cage
Discrimination weights	Stroboscope
Maze	Farbescope
Sphygmograph	Audiometer
	Dictaphone

An inspection of the foregoing table reveals the fact that no piece of apparatus was possessed by every one of the 67 laboratories. There were, however, several laboratories which had all the apparatus mentioned and more. The pieces of apparatus most frequently reported were colored papers, chemicals, tuning forks, stop watch, stereoscope, metronome, and brain models. The other pieces were all reported less than 60 times. The least

often reported were the rotating and balancing platform, photometer, algometer and chronograph. Most of the other pieces of apparatus listed are possessed by a majority of the experimental laboratories. The total number of laboratories having each piece of apparatus has been pulled down appreciably by the reports of a few laboratories which are apparently only partially equipped. Taking this fact into consideration the returns show a reasonably complete laboratory equipment on the part of the most of the institutions.

12. This question deals with the number of teachers giving part or whole time to the teaching of psychology. The results are:

MEN	NUMBER
Whole time to psychology .....	112
Part time to philosophy .....	53
Part time to education .....	50
Part time to biology .....	1
Part time to Bible .....	1
Graduate assistants .....	7
WOMEN	
Whole time to psychology .....	8
Part time to philosophy .....	4
Part time to education .....	1

All the figures are for 90 schools. Eleven did not report.

These results show a total of 120 teachers giving full time to psychology in 90 schools. This, together with the 110 giving part time, and the 7 graduate assistants, gives a comparatively good status for psychology to the number of instructors. The returns for question 8 gave 38 departments affiliated with philosophy and 15 with education, while 12 psychology departments were linked with both philosophy and education. Keeping this in

mind, it is remarkable that out of the number giving part time to other subjects there are nearly as many giving part time to education as to philosophy, altho there were at least twice as many departments affiliated with philosophy as with education. This is significant of the major emphasis which has recently been placed on applications of psychology to education. The total of 237 teachers giving either whole or part time to the teaching of psychology in 90 institutions speaks well for the general standing of the subject as a recognized one in the academic curriculum.

It is quite probable that a great many of the 90 who replied did not consider it necessary to tabulate the graduate assistants and teachers giving but a slight amount of time to psychology, so that the actual results would probably be somewhat greater than the returns indicate.

#### SUMMARY.

Briefly, then, the returns from the questionnaire are: 67 out of the 101 institutions reporting have a psychology laboratory, and the remaining 34 possess at least some apparatus. The number of laboratories is gradually increasing, the largest number established being reported for the period 1910-1919. Out of the 67 schools having laboratories, 58 have a full professor in charge of the laboratory. Likewise, 56 of the men in charge have the academic degree of Doctor of Philosophy. In 90 of the reporting schools there is a total of 120 teachers giving full time to the teaching of psychology, and 110 giving part time, with 7 graduate assistants, making a total of 237 teachers giving either whole or part time to psychology in 90 institutions.

Out of the 101, 27 reported courses in experimental education, 8 of which have their laboratories separate from the psychology laboratory. At least one course in

general psychology is offered in all but 5 of the reporting schools. Exeprimental and educational psychology have the next highest number of hours, with social psychology following, then physiological psychology and animal behavior. The returns give report of a large number of rather isolated courses dealing with small corners of the subject, and apparently rather divergent from the main field of psychology. In a total of 93 institutions there are 13,604 students registered in the psychology courses, with 503 students majoring in that subject in 35 institutions. The textbooks most often used in the general psychology are reported in the following order—Pillsbury, Angell, Breese, Judd, Titchener, James, with other texts being used from one to three times. The six psychology laboratory manuals oftenest returned are, Titchener, Langfeld and Allfort, Seashore, Breitwieser, Myers, with Whipple, whose book is not distinctly a laboratory manual also being reported twice.

Thirtyone schools report that the psychology department is independent of any other department. Of the 68 remaining, 38 are affiliated with philosophy, 15 with education, 12 with both education and philosophy, 1 with sociology, one with biology, and one with Bible.

Twenty of the 67 institutions having laboratories also have a shop. The majority of the reports show that the sophomore year is the time when students are generally admitted to psychology courses, 69 reporting in this way, 15 reported junior, 11 freshman, and only 1 senior.

The returns dealing with laboratory equipment show that most of the psychology laboratories are regularly and completely equipped.

#### *METHOD AND APPLICATIONS.*

The questionnaire returns indicate a real and tangible growth of psychology as an academic discipline, and a

hopeful and favorable status at the present time. There are other phases of the present status which have not been dealt with in the questionnaire, and which are requisite to an understanding of the position of psychology. It is not intended to deal minutely with the separate phases of the subject, but rather to write briefly of some of the broader and more general trends in the field of psychology.

More than any other one question, the matter of introspection versus the objective method has occupied the psychological publications. In the minds of most psychologists there is a broad gap between these two methods. Introspection is, of course, the older. It originated with Plato and continued to be the prevailing method until comparatively modern times; and even now according to Ruckmich's study previously quoted, it contributes more to adult human psychology than any other method. The rise of the natural sciences, however, stressing experimentation and observation has brought in the psychological distinction between the external and the internal methods and data. Locke and Berkeley, working in the scientific atmosphere created by Galileo and Newton, were the first to recognize clearly the wide distinction between the two methods. The investigators who have followed them have defined and increased it until the gap is now considered irreconcilable. So markedly is this true that the present day investigators may be roughly divided into introspectionists and defenders of the objective method, according to the method of investigation which they use and believe to be the most trustworthy. This is, perhaps, regrettable, since both methods are valuable when rightly used, and neither should absolutely exclude the other. But since there is this wide distinction between the two methods of the science, we shall at-



tempt a resumé of the meaning and purpose of each, with a view to clarifying their position in present day psychology.

The definition of the methods, as it is given by some of the leading psychologists, will first be dealt with, toward the end of making clear the real distinction before further discussion is made of the worth of the two. Pillsbury says, "The two methods of psychology are observation and introspection. One gives the phenomena as they present themselves to the onlooker, the other as they appear to the individual investigated." (1) Stout writes, "To introspect is to attend to the workings of one's own mind." "To experiment," (objective method) "is to observe under conditions which we have ourselves prearranged." (2) Titchener seems to make the whole method of psychology an introspective one, in the final analysis. "The method of psychology, then, is observation. To distinguish it from the observation of physical science, which is inspection, a looking-at, psychological observation has been termed introspection, a looking-within." (3) Ladd and Woodworth in their general discussion of method recommend a judicious use of both methods as the best manner by which to obtain a well rounded body of psychological fact. (4)

The above representative statements sufficiently point out the aim of the methods. Pepper, in the *American Journal of Psychology*, still further points out the distinctions. "First, objective data are spatial, introspective data are not spatial. Secondly, objective data are measurable, introspective data are not measurable. Thirdly, objective data are indirectly known through the mediation of the senses; introspective data are immediately known." He finally rejects these distinctions as ultimate, and analyzes the whole matter into one funda-

mental difference, which he states thus, "All of these supposed differences are fictitious. The real difference is simply this, that objective data are picked, whereas introspective data are anything that comes along." He states his position further, "There is a regular law that can be traced through the objective sciences governing the choice of data. Starting with the whole mass of experience, we find that the objective sciences make their first selection against the introspective and proprioceptive experiences. Pullings, vertigos, hungers, pleasures, pains, fancies, and imaginings are not recognized data in any objective science. In other words, kinaesthetic and organic sensations, feelings, emotions and cognitions are all ruled out of the sphere of objective method. The remaining types of experience are acceptable in the more undeveloped objective sciences, i. e., visual, auditory, tactual, olfactory, and gustatory sensations are acceptable objective data. In a thoroughly developed objective science, however, nothing is acceptable but visual data. In short an objective method is one which limits its choice of data to experience derived from the exteroceptive sense organs, and in refined objective method the data are farther limited to experience derived only from vision."

The above is typical of the defense of the introspectionists. The upholders of the objective method might, however, point out that the writer is confusing several different elements in his analysis of introspection. In the case of vision he confuses the method by which the observer makes his observations and the phenomena observed. In reaction time experiments, for instance, the experimenter may be measuring association time or attention, and at the same time be making his observations mainly by means of the end organ of vision; yet it cannot

be validly argued that visual data are being registered. The data are being registered visually but they are not, therefore, visual data. The same holds true in other cases: vision is naturally the principal method of observation, but the phenomena observed may be varied. His statement that the objective method accepts only data from the exteroceptive organs seems hardly a fair one. We observe the phenomena exteroceptively, and they may appear exteroceptively, but they may furnish measures of strictly mental facts, as in the measurement of attention in reaction time. According to a fair statement it would seem that the objective method may deal with mental facts as well as the sensations of the exteroceptive system; while introspection may report on the flow of inner experiences which have been objectively measured. It is true that there are some things that cannot be measured objectively, and in this sense the objective method picks its data. It is likewise true that introspection deals with "anything that comes along." Nevertheless, introspection without the empirical checks of external observation is liable to run riot. (5)

Further we have writers on the subject stating that "psychology must be studied only by careful watching of the processes of the individual by the individual himself; one who does not proceed in this way is no psychologist, no matter how valuable his work may be as physiology or biology or sociology." The two statements above are examples of the position of the introspectionists. On the other hand we have such men as Watson asserting that psychology is really behaviorism, with the objective method its only one. "I firmly believe that two hundred years from now, unless the introspective method is discarded, psychology will still be divided on the question as to whether auditory sensations have the quality

of "extension": whether intensity is an attribute which can be applied to color; whether there is a difference in 'texture' between image and sensation, and upon many other points of like character." (6)

Again we have Wallis of California criticising introspection thus: "An uncontrolled introspection can be nothing else than haphazard and resultless. The introspective error can be corrected only when the within is correlated with the without. Until introspection is removed from the realm of the unique individual insight and made part of an inclusive system of external tests we have no accepted criterion, no uniform method. We must think into ourselves, not look into ourselves. A looking which is not a thinking provides no corrective for its illusions. If we apply an objective test, the unique advantage which an individual has with regard to his own experience is supplemented with an opportunity to view himself as would an outsider, and to apply a rigid standard over and above the elastic introspective analysis. After all it is the outside world that leads a man to knowledge of his self rather than a knowledge of his self that gives him a grip upon the outside world." (7)

Dunlap pronounces another characteristic criticism of the "within looking" method of psychology. He objects to the broad use of the term 'introspection' as it is used by some to cover the whole field of psychological experimentation. He concludes his article: "There is, as a matter of fact, not the slightest evidence for the reality of 'introspection' as the observation of 'consciousness'. Hence we must, in default of such evidence, reject the empty assumption of such a process. We might keep the word to apply to the processes described above (observation of feelings and kinaesthetic and coenaesthetic sensations); a term by which to designate the observa-

tion of these factors would be very useful, and introspection is the legitimate term for the purpose since these factors are the real 'inner' ones of which psychology has been talking for so long a time, but in view of the word's quite disreputable past it is probably better to banish it for the present from psychological usage." (8)

One of the fairest of the criticisms of the introspective method is one made by Titchener in the *American Journal of Psychology*. "Psychological description, however, is never easy; the verbal formulas of the most highly trained observers are likely to be very imperfect; every new investigation leads to a new result. Moreover, psychological description is always warped by prepossession; we have a host of terms—secondary criteria, stimulus error, logical reflection, laboratory atmosphere, faculty tradition, pleasure-pain dogma, associationism, sensationalism, intellectualism, and many more—that are used by critics to stigmatize the bias of the observer. Certain forms of prepossession take shape within psychology; certain others are prior to any psychological observation; the observer is not simply a psychologist, but moves, so to say, in various worlds, of which the psychological is at best only one, and may be one of the less familiar; it is natural, then, that confronted with a difficult task, he should be tempted to adopt an attitude more habitual than that of psychology, and to offer as psychological description a report which in fact is not psychological at all. The temptation to the shift of attitude is, indeed, exceedingly strong; for the situation in which the psychological observer is placed bears a close resemblance to situations which arise outside of psychology, and which must be met by all of us every day of our lives." (9)



The quotations here given are representative of the conflict continually going on in the psychology journals between the defenders of the two methods of procedure in gaining psychological data. They are indicative of the trend away from the older method and toward the purely objective. However, we may stand in the controversy, there is one thing outstanding, which is that the advocates of method are too often liable to exalt the method at the expense of the science they try to advance by means of the method; to make the science conform to the method, instead of vice versa. This is strikingly evident in the articles of the two opposing schools--behaviorists and introspectionists. For instance the introspectionists, explaining the thought processes, place the whole emphasis on images. Thinking that does not go on in images is not thinking. Individuals who think but say they do not use images have overlooked the images through faulty introspection. On the other hand we have Watson announcing that psychology is behaviorism and transferring the thinking processes to the outside where everything can be seen. For him thinking is found in certain physical contractions and movements.

This is the situation at present with regard to method. In many of its phases it is a regrettable one, since it too often causes an exaltation of method at the expense of psychology. There is too little of the 'live and let live' spirit. It would seem that psychology offers enough breadth of viewpoint to allow for the use of different methods, and the correlating of the results of all without useless wrangling. To give up entirely the method which has produced most of our present knowledge seems foolish. On the other hand to reject the newer scientific experimental method seems equally absurd. There should be room for both with open acceptance of the data of

both in so far as they are obtained under scientific conditions.

Parallel with this goes the discussion of behaviorism, which is really one with objective method in its fundamental bases. Likewise controversy rages over the nature of the self, if there is one; over mind, if it exists; and over consciousness, if there is any consciousness. All three of these are gradually disappearing from the literature of present day psychology. Many of the leading psychologists prefer to do without them entirely.

Another noticeable movement in psychology is that toward an intense specialization and separation out into different and minute fields of investigation. The variety of courses returned in answer to the questionnaire is evidence of this. To cite a few of the more evident and most dealt with courses; physiological, genetic, comparative, behavioristic, educational, applied, business, general, abnormal, and a dozen other more specialized fields. We have texts dealing with each of these different phases, but none which correlates them all. Recalling the conflict in method, the different standpoints on mind, consciousness, and self, to cite only a few, together with manifold different fields within the general field of psychology, we cannot but realize that the beginner in psychology must be confused by all the conflicting attitudes with which he meets. The field seems to him to have no unity and no agreement. It shows no approved method; no one acknowledged aim. All of them he must correlate for himself, if he can. There is, of course, a decided unity in the minds of the psychologists themselves in most cases, but there is a decided need for a text which shall, like that of James, gather up and correlate and unify the varied strands into which the field has separated, we might almost say disintegrated. Only in some such way

can the beginner be enabled to get any definite grasp of the subject into which he is entering.

The fact of specialization is not, however, deplorable. It rather shows added promise for psychology. The most fruitful fields at present are, probably, those in which psychology is being applied. The past few years have seen a growing application of psychology to the field of education. This is evidenced by the number of texts and magazine articles which have appeared, purporting to deal with some phase of educational psychology. The topics most treated have been child psychology, adolescence, formal discipline, mental tests, methods of study and learning. The treatment of these subjects shows a decided tendency away from the old philosophy of education and toward the experimental standpoint of modern psychology. Baldwin makes this statement regarding the subject matter dealt with in educational psychology in college courses: "From questionnaires filled out by 53 professors of educational psychology, Hall-Quest finds that educational psychology as now taught in our colleges and universities embraces the learning process, instincts, habit formation, individual endowment, the study of defective and exceptional children, the psychology of school subjects and its application to supervised methods of teaching, statistics, with general psychology as the essential prerequisite." (10, 11, 12)

This emphasis upon the psychological application is not only added evidence of the usefulness of psychology, but also of the advance of education.

The field of sociology has also been a fruitful one for psychological application. In the past few years it has come to be widely recognized that psychology is necessary for a thorough and systematic understanding of sociological science. It has been seen that the cus-

toms, institutions and actions of society are best understood in the light which psychology casts upon human behavior. Ross published in 1908 his *Social Psychology*, which was the first book to deal with that field in any comprehensive way. Ross himself speaks of it as, "the pioneer treatise in any language professing to deal systematically with the subject of social psychology." (13) This has been followed by MacDougal, Ellwood and others.

The application to the fields of education and sociology has been the greatest, but the application has by no means stopped there. It has been carried over into the field of business and has been used in employment and management, in advertising and salesmanship, and a host of other ways. It has also been carried into literature and language, and there are in fact few fields which are able to complete their data without reckoning with the pronouncements of psychology.

The recognition of the practical value of psychology has nowhere been more strongly evidenced than by its use in the world war. The way in which psychology has been used in the organization of our armies has been conclusive proof to many doubters that it has a decidedly practical value outside of the strictly academic world. It likewise prophesies more practical applications in the future.

Early in 1917 the National Research Council organized a committee to deal with the psychological problems of the United States military organization. This consisted of Hall, Thorndike, and Cattell from the National Academy of Sciences; Franz, Whipple, and Dodge from the American Psychological Association; Seashore, Watson, Yerkes from the American Association for the Advancement of Science. Various other committees were

formed to deal with the particular problems of the different arms of the service. Large numbers of trained psychologists volunteered for psychological service, and many of the laboratories of the country were placed at government disposal. The work of the Psychological Branch of the Army has been added proof of General Crowder's statement, "The war will be won through a judicious expenditure of brain power rather than a stupendous expenditure of man power." (14)

The mental tests devised by the committee on the Psychological Examination of Recruits were on the following general lines, according to Terman. (16)

1. "It permitted 'group examining' so that the examiner could test several hundred men in less than an hour.

2. The procedure in giving the tests was so minutely laid down that anyone of a hundred examiners testing a group would get the same results.

3. The test questions were ingeniously arranged so that practically all could be answered without writing, by merely drawing a line, crossing out, or checking.

4. By the use of scoring stencils the personal equation was entirely eliminated from the grading of papers. When the stencil is placed upon the paper it shows instantly the number of correct answers. The test papers are in fact scored by enlisted men who knew nothing about psychology.

5. Coaching was guarded against by making five different 'forms' of the scale, each 'form' differing entirely in substance from every other 'form', yet all exactly equal in difficulty, and alike psychologically."

There are three types of mental tests generally used in the army. First is the Alpha Mental Test for men literate in English; second the Beta test for foreigners and illiterates; and last, individual tests for men who fail to pass the Beta test. The individual forms are the Yerkes-Bridges Test Scale, Performance Scale, and Stanford Binet Scale. In addition to the general intelligence



tests, specialized tests such as trade tests, and those to discover individual differences in experience were given.

After a brief trial of the tests as outlined, they were given further trial in four National Army cantonments. The results were so valuable that the government ordered the tests used in all the cantonments, and a Division of Psychology was established in the office of the Surgeon General. Likewise, Fort Oglethorpe, Ga., was devoted to training officers for this branch. Terman reviews the points in which the application of these tests have proved valuable.

1. "In the discovery of men whose superior intelligence recommends their advancement.

2. In the prompt selection and assignment to Development Battalions of men who are so inferior mentally that they would retard the training of other soldiers.

3. In forming organizations of uniform mental strength where such uniformity is desired.

4. In forming organizations of superior mental strength where such superiority is demanded by the nature of the work to be performed.

6. In eliminating from the army those men whose low grade intelligence renders them either a burden or a menace to the service.

It is highly significant to note in this connection the recognition given to psychology in the courses given to men in the Students' Army Training Corps. The Committee of the War Department on Education and Special Training placed it thus as a war subject, necessary for the training of efficient soldiers. A sub-committee of the Research Council was appointed to outline and organize the courses. This group of men suggested three main courses. These will be given here in outline:

1. The study of human action.

- a. General characteristics of human action and the conditions of effective reactions to new situations.

- b. Individual differences and their military exploitation.
  - c. The learning process. General characteristics of habit formation. Plasticity. Fluctuation. Improvement and its limits. Fatigue.
  - d. Motivation and morals—interests—motor activities—ideals.
  - e. Principles of leadership—crowd psychology, leadership, etc.
  - f. Psychology of observation and report.
2. Educational Psychology.  
Special emphasis on personnel problems, mental testing and mental examination, education of retarded adults and of wounded.
3. The Psychology of Reasoning.  
Perception, conception, memory, imagination, and reasoning. (The topics under reasoning are particularly significant. "Psychology of meaning, natural and conventional symbols. Systems of experience and their implications. The mind of an expert. Difficulty of distinguishing between observation and interpreting. Correct interpretation as the goal of thinking. Distinction between cocksureness and critical certainty. The mind of an amateur. The collection of data. When the data are adequate. What facts are relevant. The explanation and implication of a fact. Interpretation by analogy; its popular appeal and its dangers. The analysis of data. Reference to systems of cause and effect. Systematic fragments of information. Circumstantial evidence. The making and testing of hypotheses. Values and dangers of hypotheses. Natural law and practical certainty. The elimination of probability. Common sources of error and inference. Tradition and habit. Emotional bias and prejudice. Suggestibility. Fixed ideas and delusions. The reasoning of crowds. Fallacies.")

These headings indicate the practical value of psychology in its application to problems of experience, and these courses are a significant recognition of the real national and practical value of the new science. It has taken its place with the older and better established sciences, biology, chemistry, and physics, as a force to be reckoned with in experience and human progress. (18)

*AMERICAN PSYCHOLOGICAL PERIODICALS.*

A discussion dealing with the present status of psychology in America would be incomplete without mention of the numerous journals and magazines which are the official organs of the psychological schools of investigation. A citation of the list gives a good idea of the scope to which psychological discussion and investigation have attained.

American Journal of Psychology.

Pedagogical Seminary.

Psychological Review.

Psychological Bulletin.

Psychological Monographs.

Psychological Index.

Journal of Philosophy, Psychology, and Scientific Methods.

Archives of Psychology.

Journal of Abnormal Psychology.

Psychological Clinic.

Training School Bulletin.

Journal of Religious Psychology.

Journal of Race Development.

Journal of Educational Psychology.

Journal of Animal Behavior.

The Behavior Monographs.

Psychoanalytic Review.

Journal of Experimental Psychology.

Journal of Applied Psychology.

Note.—Some of the above were discontinued during the period of the war.

It will be immediately evident from the list that to keep well informed of movements in the field of psychological research must be a stupendous task, since there exist so many magazines bearing upon these re-

searches. This list is still further evidence of the specialization and arborization of the science, and demonstrates also the chaotic situation with which a beginner finds himself confronted. It is at the same time, however, good evidence of the increasing scope of psychology, and the rank which it is taking as a science.

*Psychological Definition.*

With the differences over the method and subject matter of psychology there goes also a difference in the matter of definition. Some of the main terms of the subject have been matters of controversy, and the accusation that the psychologists themselves do not know what they are about has not infrequently been made, and not entirely without justification in the past. Recently, however, there has been a concerted effort to get a uniformity of understanding and usage for some of the principal psychological terms. At the 1918 meeting of the American Psychological Association a committee was appointed to "consider the matter of uniformity in the usage of psychological terms." The committee drew up tentative definitions and submitted these for criticism to 150 psychologists. On the basis of the 60 replies received their report was drawn up. The definitions fell into three groups with their modes at 90, 60, 30. The results are not hard and fast definitions, but are rather intended as indications of the actual meaning of the terms in the minds of most psychological writers and teachers. They serve to at least delimit the field. These delimitations are valuable as showing the advance toward uniformity, or at least an effort in that direction, as well as the current usage of the terms of the subject. The definitions given below are taken from the report of the committee of the American Psychological Association. (19)

- (18) Report; Courses in Psychology for the S. A. T. C.; Psych. Bull.; 1918; 15; 129, 136.
- (19) Report; Definition and Delimitation of Psychological Terms; Psych. Bull.; 1918; 15; 89-95.
- 1. PSYCHOLOGY:
  - a. The science of mental phenomena.
  - b. The science concerned with the mutual interrelations of psycho-biological organisms and their environments.
- 2. PSYCHOLOGICAL:
  - a. Pertaining to psychology. (This adjective is often improperly used instead of mental or psychological.)
- 3. MENTAL PHENOMENA:
  - a. Phenomena characterized by relation to consciousness.
  - b. Phenomena pertaining to any of the following: mind, consciousness, content of consciousness, self, subconsciousness.
  - c. Phenomena characterizing the subjective relations of psycho-biological organisms with their environment.
- 4. MIND:
  - a. The totality or system of mental phenomena.
- 5. MENTAL:
  - a. Pertaining to mind or its phenomena.
  - b. Pertaining to consciousness.
- 6. MENTAL LIFE:
  - a. Mental phenomena in the process of development and disintegration.
- 7. (MENTAL) ELEMENT:
  - a. A (mental) fact which is apparently simple, i. e., which remains unanalyzed at the present state of knowledge.
- 8. INTROSPECTION:
  - a. The direct observation of one's own mental processes.
- 9. CONSCIOUSNESS:
  - a. The distinctive basal characteristic of mental life in actual process; awareness.
  - b. The subjective accompaniment of certain neural processes.
- 10. SUBJECT OF CONSCIOUSNESS:
  - a. That which is conscious.
- 11. OBJECT OF CONSCIOUSNESS:
  - a. That of which the subject of consciousness is aware.
  - b. The content of consciousness viewed as a term in the subject-object relation.



12. CONTENT OF CONSCIOUSNESS; MENTAL CONTENT:
  - a. The items, collectively considered, which at any time constitute mental life.
  - b. The constituents of mental life at a given moment, viewed from the structural standpoint.
13. PROCESS OF CONSCIOUSNESS; MENTAL PROCESS:
  - a. Change of consciousness.
  - b. Phenomena of consciousness considered as changing.
14. ITEM OF CONSCIOUSNESS:
  - a. Any single phenomena of consciousness.
15. SUBCONSCIOUSNESS:
  - a. Mental phenomena which in degree of vividness or clearness are below the limen or threshold of distinct consciousness; sub-liminal consciousness.
16. (THE) SUBCONSCIOUS:
  - a. A mental life or detached phase of mental life (judged to be present in an individual) of which the individual is not directly aware; a subordinate (or coordinate) consciousness.
17. UNCONSCIOUS:
  - a. A term used to characterize activities of the organism unattended by consciousness.
18. AWARENESS:
  - a. A synonym for consciousness.
19. EXPERIENCE:
  - a. Any modification of consciousness or the sum total of such modifications.
  - b. A psychical modification of the psycho-biological organism which occurs either as effect or concomitant of change in the environment.
20. SELF:
  - a. A conscious individual, characterized by persistence and by change.
  - b. A mind regarded as consciously distinguishing itself from what is not itself.
  - c. A conscious individual in union with an organized body.
  - d. The individual regarded as a progressively organized system of mental functions and processes.
  - e. The subject of consciousness (or experience) accompanying any complex of mental processes attentively experienced.

21. PSYCHE:
  - a. The being or nature manifested in mental phenomena.
22. PSYCHIC; PSYCHICAL:
  - a. Pertaining to mind, or consciousness, or to psyche; mental.
  - a. A somewhat indefinite historic term, formerly used to designate the generic subject matter of psychology.
  - b. In modern usage a synonym for psyche.
24. INDIVIDUAL:
  - a. A single psychological organism.
  - b. A single being, uniquely determined and differentiated.
25. PSYCHO-BIOLOGICAL ORGANISM:
  - a. A conscious, living unit.
26. ENVIRONMENT:
  - a. A term covering all psychochemical, biological, and social phenomena acting from without upon a given organism.
27. BEHAVIOR:
  - a. The reaction of an organism to its environment (biological usage).
  - b. Those simple or complex changes in an organism which follows or are concomitant with mental phenomena and which may be observed in another organism than that of the observer or in his own (psychological usage).
28. BEHAVIOR PSYCHOLOGY:
  - a. The systematic presentation of psychology in terms of behavior.

The report is signed by

HOWARD C. WARREN, Chairman.  
 MARY W. CALKINS  
 KNIGHT DUNLAP  
 H. N. GARDINER  
 CHRISTIAN A. RUCKMICH.

It must, of course, be recognized that this is not an authoritative series of definitions, but it does show the current usage of psychological terms. The report has been prepared by representative psychologists from the preferences of the 60 who replied to their definition questionnaire. There are evident certain fallacies and con-

traditions from the standpoint of logical definitions. For instance, mind and consciousness are defined in terms of each other, which gets nowhere. Nevertheless, the definitions give a fair idea of the usage of the terms and their present status. That an effort should be made to get a certain degree of uniformity is encouraging.

Even with a comparative uniformity in terms, however, psychology is far from having a unified body of subject matter. A casual reading of the foremost journals and of the books on psychology shows that there is not only some discussion of actual subject matter, but also a great mass of pseudopsychology: material which claims psychology as its field, but which does not use the scientific methods of psychology. From many sides the subject has been beset by quackery, and has by this means been given a distorted reputation in the minds of some. The work of Jung, Freud, and others of that school might be noted as near examples of this type of work; or at least as men whose work has "gone to seed" with one particular idea which has been used for more than it is worth.

Added to this is the fact that there is a great deal of seemingly useless experimentation; work which covers ground virtually covered before. A working over of the periodicals for the past few years will convince of this, and show a useless repetition of experiments. However, the amount of valuable work far overbalances the repetition.

### *SUMMARY.*

An investigation of the general status of psychology, aside from the facts brought out by the questionnaire, show first a controversy over the method of psychology, with the objective methodists having rather the best of the contest. The number of psychological periodicals in-

icates the productivity and scope of the field, and also demonstrates that the subject has become specialized almost to a point where it amounts to disintegration; an analysis of the contents especially indicates this. The terms consciousness, self, and mind are passing out of psychological usage; while there has been recently an attempt to standardize the meaning of terms most in use with a view to uniformity. A broad survey of the field reveals the fact that the whole subject of psychology has become divided into a great many different branches, which have never been correlated in any textbook or treatise. Psychology is at present like a rope, the different strands of which have become unraveled and disintegrated. Since the monumental work of James there has been no real attempt at unification, at a rewinding of the separated strands. For the benefit of beginners in psychology, especially, this appears highly necessary: as well as for the future of the science.

There is, however, a brighter side to the modern situation. The application of psychology to education, sociology, business, and the like has proved its practical value for the life of the world. This has been demonstrated beyond doubt in its use in the world war. The whole trend of the situation seems to indicate that psychology is destined now, if it has never been evident before, to take a high rank among the other sciences, not only as an academic discipline, but as a science whose data are indispensable for civilization. There remains the work of unification to be done, but the future, contemplated in the light of the present status, is full of promise.

- (1) Pillsbury, W. B.; *The Fundamentals of Psychology*; Macmillan; N. Y.; 1916.
- (2) Stout, G. F.; *Manual of Psychology*; N. Y.; Hinds, Noble and Eldridge; 1899.

- (3) Titchener, E. B.; A Textbook of Psychology; N. Y.; Macmillan; 1910.
- (4) Ladd and Woodworth; Elements of Physiological Psychology; Scribners; 1911.
- (5) Pillsbury, W. B.; The Function and Test of Definition and Method in Psychology; Science; 1915; 41; 271-380.
- (6) Watson, J. B.; Psychology As The Behaviorist Views It; Psychol. Rev. 1913; 20; 164.
- (7) Wallis, W. D.; Is Introspection Individual or Social, With-in or Without? Amer. J. of Psychol.; 1916; 27; 572-573.
- (8) Dunlap, K.; The Case Against Introspection; Psychol. Rev.; 1912; 19; 404-412.
- (9) Titchener, E. B.; Description vs. Statement of Meaning; American J. of Psychology; 1912; 23; 165-182.
- (19) Baldwin, B. T.; Educational Psychology; Psych. Bull.; 1917; 14; 341-351.
- (11) A Survey of Psychological Investigations With Reference to Differentiations Between Psychological Experiments and Mental Tests; Report of Committee on Academic Status of Psychology; 1916; 34.
- (12) Mitchell, David; Child Psychology; Psychol. Bull.; 1917; 14; 361-361.
- (13) Ross, E. A.; Social Psychology; 1908; MacMillan; Preface.
- (14) Crowder, Gen.; Interview with; Lit. Dig.; Sept.; 14; 1918.
- (16) Terman, L. M.; The Use of Intelligence Tests In The Army; Psych. Bull.; 1918; 15; 177-187.
- (16) Yerkes, R. M.; Psychology and National Service; Psych. Bull.; 1917; 14; 259-263.
- (17) Various Members of the Committee on Classification of Personnel In the Army; How The Army Uses Individual Difference In Experience; Psych. Bull.; 1918; 15; 187-206.



## SEQUENCE OF TOPICS IN ELEMENTARY TEXT-BOOKS.

The preceding discussion indicates that the field of psychology is in a state of specialization amounting almost to disintegration. There is wide disagreement in definition, treatment, and aim of psychology. In many of its phases lack of uniformity is glaringly evident, and it is from this standpoint that psychology has often been attacked both from within and from without. While making the analysis of texts, which will be taken up in the last chapter, the attention of the writer was attracted to a study of the sequence of topics in the general psychology textbooks most used at present in the United States. Interest in this connection was stimulated by an article by L. W. Sackett of the University of Texas, in which he asserts that "the most obvious part in the modern teaching of psychology noticeable even to the casual observer is the variation in the sequence of topics presented. There is little uniformity of sequence, writers or teachers choosing their own arrangement to suit their own private purpose, or, seemingly, with no clear purpose at all." (1)

Starting with this observation, Sackett chose an arbitrary arrangement of topics, and in comparison with it tabulated the order in which the same topics appeared in eleven different textbooks. The texts used were those of James, Calkins, Angell, Judd, Pillsbury, Titchener-Primer and Text, Thorndike, Ebbinghaus, Bolton, and Halleck. The results of this comparison appear in Table I. Then fearing that the arbitrary order of topics had in some way prejudiced the variation, he compared the order of the eleven texts, using James' *Briefer Course* as the standard. The results of this appear in Table II.

TABLE I.

	Association	Memory	Imagination	Apperception	Perception	Conception	Sensation	Nervous System	Discrimination	Judgment	Reasoning	Habit	Instinct	Emotion	Interest	Attention	Imitation	Suggestion	Will
Arbitrary	1 2 3	4 5	6 7 8	9 10	11 12	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40
Angell	9 10 8	6 5	3 4	1 2	7 8	11 12	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38
Calkins	11 12 6	3 5	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46
James	8 10 11	12 5	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46
Judd	10 11 12	3 5	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46
Pillsbury	6 9 10	3 5	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46
Titchener Pr	7 11 12	3 5	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46
Titchener Text	8 9 10	7 6	16 2 1	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46	47 48
Thorndike	13 14 1	3 5	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46
Ebbinghaus	1 10 5 12	11 4	2 3	16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46
Bolton	5 9 10 11	9 5 8	1 4	16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46
Hallack	8 7 9 5	6 10 1	1 4	16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44	45 46

TABLE II.

	Sensation	Nervous System	Habit	Self	Attention	Conception	Discrimination	Association	Interest	Memory	Invention	Apperception	Perception	Reasoning	Imagination	Intuition	Will
James	1	2	3	4	5	6	7	8	9	10	11	12	5	14	15	16	18
Arbitrary	7	8	11	18	15	6	9	1	14	2	3	4	5	10	13	12	17
Angell	5	1	2	18	3	11	4	9	17	10	8	6	5	12	15	13	16
Calkins	2	2.5	8	1	11	14	×	12	×	13	6	×	5	16	17	7	18
Judd	3.5	1	7.5	16	6	4	×	9	×	10	12	×	3.5	15	13	7.5	17
Pillsbury	3.5	1	2	18	4	11	×	6	5	9	10	×	8	13	16	14	17
Titchener, Pr.	2	1	8	16	4	15	×	7	×	11	12	5	6	14	9	10	×
Titchener, Text	2	1	5	18	4	15	16	8	×	9	10	7	6	17	14	12	×
Thorndike	1	8	10	×	7	5	11	12	18	13	4	×	3	14	6	9	17
Ebbinghaus	4	2	×	15.5	8	×	×	1	9	10	5	12	11	15.5	18	×	7
Bolton	8	1	×	×	×	15	×	5	17	4	10	11	9	14	16	3	18
Halleck	4	1	18	×	3	10	×	8	×	7	9	5	6	12	13	15	16

Sackett describes his method of tabulating thus:

"When a topic was not discussed by an author it has been indicated by an X and the topic immediately following it in the arbitrary order has been raised one rank and all numbers above correspondingly raised. For example, Thorndike treats perception as a second topic, but as he gives no discussion of apperception, perception is given third instead of second rank, and imagination is given fourth rank although it is really the third topic discussed."

Sackett thinks that psychologists are facing a great lack of uniformity in their science, and that this is largely evidenced by the wide variations which are shown in the preceding tables.

With these results as a background, he sent a questionnaire to teachers of psychology. It dealt in part with the order of topics in beginners' texts. Thirty seven replies were received. They showed wide variation in the opinions expressed regarding texts and sequence of topics. Very few, if any, were entirely satisfied with the arrangement of the texts. One man replied, "If you want my candid opinion I would say that I would chuck the whole lot in the middle of the Atlantic ocean and start over again." Sackett thinks that the replies indicate "marked unrest" among those who are teaching psychology. The order of topics returned in the 37 replies represents what he calls a "chaotic situation. In fact they showed very little uniformity. He tabulated the results of the replies in a third table, which shows comparatively as great a mean variation as the table of actual sequence in textbooks. Taking into consideration the general dissatisfaction felt with the texts, and the consistent disagreement among individuals, this is very significant. The variation of sequence in the texts is comparatively as wide as the average of the individual opinions of the 37 men who answered the questionnaire. This seems to indicate a general and disastrous lack of uni-

formity both among teachers and among textbook writers.

However, in reading some of the more prominent general texts, it seemed to the writer that the sequence variation was not as shockingly great as Sackett's article would indicate. It occurred to the writer that the lack of uniformity, as shown by Sackett's first two tables, had been influenced, perhaps, by the method used. Some of the textbooks compared by him are now seldom used, and several have been revised. For instance, Judd has written a new edition of his book, appearing in 1917. The one Sackett uses is dated 1912. Pillsbury and Angell have both turned out later editions than the ones used by Sackett. As the returns from the Colorado College questionnaire show, Thorndike, Calkins, Ebbinghaus, Bolton, and Halleck are little used in college courses, if at all. It might, perhaps, be expected that sequence in these books would vary more than in the more recent books. The list of topics used for the purpose of Sackett's comparison, (James) includes certain ones that are not usually treated at length by present day writers of elementary texts. They are usually brought under some more general subject. The topics compared in the order according to James are these: Sensation, nervous system, habit, self, attention, conception, discrimination, association, interest, memory, imagination, apperception, perception, reasoning, emotion, instinct, imitation, will. A careful inspection of Sackett's tables, and an investigation of the best known texts, reveal the fact that the topics of discrimination, apperception, interest, imitation, and conception, are discussed by most authors, when discussed at all, under some larger and more general topic. Discrimination and conception are usually treated under the head of reasoning. Imitation is discussed with the



instincts, apperception with perception or under some more general subject, interest usually goes with attention; or with some aspect of behavior in the behavioristic texts. In the analysis of space, which has been made in connection with the closing chapter of the thesis, it was found that the topics of sensation, nervous system, habit, self, attention, association, memory, imagination, perception, reasoning, feeling, instinct, and will, are the ones to which the major portion of textbook space has been given. The presence of the topics less often discussed, in view of the fact that when a topic was not treated Sackett raised the next one a rank, probably tended to make the variation greater. It was thought that this, together with the comparison of some texts now obsolete, has made the variation seem greater in his tables than it is at present in the texts most widely used. It has been thought, therefore, that a table of sequence in which the 13 main topics above mentioned are tabulated would afford a fairer and more fundamental comparison. It should also throw light on whether or not the variation in sequence of topics in beginner's psychologies is sufficiently great to cause any alarm regarding too wide difference among writers who are most apt to influence those who are beginning psychology.

In making this comparison the 13 topics have been used, taking them in the order according to James, omitting those indicated above, and the orders in the other five books have been tabulated. The first comparison of order has been made using the six texts which the questionnaire showed to be most widely used. (2, 3, 4, 5, 6, 7)

In some of the textbooks subjects which are given only a few pages of space even less than that given to the five excluded subjects have been included, as for instance

TABLE A

	Jones	Prechauer	Pillsbury	Angell	Wood	Long	T. L.	Acworth	Mean Variations
Sensation	1 (1.3)	1 (1.3)	2 (.3)	5 (2.6)	3 (.6)	2 (.3)	11 (6.6)	2.5	1.1
Nervous System	2 (.8)	8	1 (.2)	1 (.2)	1 (.2)	1 (.2)	6 (1.6)	1.2	.3
Habit	3 (2.3)		3 (.2)	2 (.3)	11 (.6)	6 (1.)	25 (11.)	5	2.8
Self	4 (.7)		13 (2.)	13 (2.)	13 (2.)	12 (1.)	55 (11.)	11	2.8
Attention	5 (1.5)	2 (1.3)	5 (1.5)	3 (.5)	2 (1.5)	4 (.5)	21 (7.)	3.5	1.2
Association	6 (.2)	1 (1.8)	11 (8)	10 (8)	7 (1.2)	9 (1.2)	31 (10.)	5.8	1.7
Memory	7 (.4)	5 (1.6)	7 (.4)	8 (1.4)	5 (.6)	8 (1.4)	40 (5.8)	6.6	1.0
Imagination	8 (.5)	6 (1.5)	8 (.5)	7 (.5)	6 (1.5)	10 (2.3)	15 (7.)	7.5	1.2
Perception	9 (3.5)	3 (2.5)	6 (.5)	6 (.5)	1 (1.5)	5 (.5)	33 (9.)	5.5	1.5
Reasoning	10 (1.)	9 (.0)	9 (.0)	9 (.0)	8 (1.5)	11 (2.)	56 (4.)	9.0	.7
Feeling	11 (2.4)	8 (.6)	11 (2.4)	10 (1.4)	9 (.4)	3 (3.6)	52 (12.8)	8.6	2.1
Instinct	12 (2.2)		10 (.0)	11 (1.)	10 (.0)	7 (3.)	50 (6.)	10	1.2
Will	13 (1.5)	7 (1.5)	12 (.5)	12 (.5)	12 (.5)	13 (1.5)	69 (.9)	11.5	1.5

TABLE B  
Mean Variations of  
Table I.

[illegible]

TABLE C  
Mean Variations  
of Table II.

	James	Arbitrary	Angell	Calikins	Judd	Pillsbury	Primer	Text	Titchener	Thorndike	Ebbinghaus	Bolton	Halleck	Total	Average	Mean Variation
Sensation	2.5	3.5	1.5	1.5	0.	0.	1.5	1.5	2.5	.5	4.5	.5	43	(21)	3.5	1.7
Nervous System	.4	5.6	1.4	.1	1.4	1.4	1.4	1.4	5.6	.4	1.4	1.4	29.5	(21.9)	2.4	1.8
Habit	4.4	3.6	5.4	.6	.1	5.4	.6	2.4	2.6	×	×	×	10.6	74.5	(35.7)	7.4
Self	9.8	4.2	4.2	12.8	2.2	4.2	2.2	4.2	×	1.7	×	×	×	124.5	(45.5)	13.8
Attention	1.3	8.7	3.3	4.7	.3	2.3	2.3	2.3	7.1	7.1	×	×	3.3	70	(30.9)	6.3
Association	.9	6.1	1.9	4.9	1.9	1.1	.1	.9	4.9	6.1	2.1	.9	86	(31.8)	7.1	2.6
Memory	1	7	1	4	1	0.	2	0.	4	1	5	2	108	(28)	9	2.3
Imagination	2.7	5.3	.3	2.3	3.7	1.7	3.7	1.7	4.3	3.3	1.7	.7	100	(31.4)	8.3	2.6
Perception	5.7	1.8	.3	1.8	3.3	1.2	.8	.8	3.8	4.2	2.2	.8	81.5	(26.7)	6.8	2.2
Reasoning	2.8	.8	2.2	1.2	2.2	.3	1.2	5.2	1.2	2.2	.2	.2	166.5	(20.3)	13.8	1.7
Feeling	1.3	.7	1.3	3.3	.7	2.3	4.7	.3	7.7	4.3	2.3	.7	165	(29.6)	13.7	2.4
Instinct	5.7	1.2	2.7	3.8	3.3	3.2	.8	1.2	1.8	×	7.8	4.2	119.5	(35.7)	10.8	3.2
Will	2.3	1.3	.3	2.3	1.3	1.3	1.3	2.7	.7	8.7	2.3	.3	189	(24.8)	15.7	2.0

TABLE D.  
Comparative M. V.  
of Tables A, B, C.

	A—Mean Variation for Revised Order	B—Mean Variation for Sackett's Arbi- trary Order	C—Mean Variation for James' Order After Sackett	Mean Variation for Sackett's Question- naire Replies.
Sensation ..	1.1	1.7	1.7	2.1
Nervous System ..	.3	2.0	1.8	1.6
Habit ..	2.8	3.9	3.5	3.6
Self ..	2.8	5.7	5.0	3.6
Attention ..	1.2	3.0	2.8	3.2
Association ..	1.7	2.6	2.6	1.6
Memory ..	1.0	2.4	2.3	2.2
Imagination ..	1.2	2.6	2.6	1.8
Perception ..	1.5	2.2	2.2	2.4
Reasoning ..	.7	1.5	1.7	0
Feeling ..	2.1	2.6	2.4	3.2
Instinct ..	1.2	3.5	3.2	4.5
Will ..	1.5	2.7	2.0	0.9
Average Variation ..	1.4	3.0	2.8	2.8

Breese's two page discussion of instinct, but only because the majority of books give enough space to them to make them rank among the thirteen in the final analysis. In some texts it has been hard to determine the exact order, since the discussions sometimes overlap and are mixed with each other, but as fair a tabulation as possible has been made. The first table shows (Table A) the comparative sequence of the 13 topics in the 6 main texts, with their mean variation.

In Table B the mean variations for Sackett's Table I have been listed. On account of space convenience the table itself has not been repeated. Only in the column headed 'total' the total of the sequence numbers is given with the total of the variations; also the average of the



sequence rankings. Sackett's Table I, it will be remembered, was a result of the sequence tabulation with his arbitrary order as a basis. In both Table B and Table C only the 13 topics compared in Table A have been listed. The other 5 topics used by Sackett have been omitted, for reasons already explained.

Table C gives the mean variations for Table II, where Sackett tabulated the topic sequence with James' order as a basis. The same plan has been followed as in the preceding table.

In the fourth tabulation, Table D, the comparative mean variations for the three above mentioned, and for the return from Sackett's questionnaire to the 37 teachers, are listed. This table contains the significant results. A brief glance will show that the mean variations in the first column are well below those in the other three columns. The average variations at the foot of the columns bears this out more clearly. In fact, the average variation in the first column is nearly a half smaller than that in the second column where the variations for Sackett's arbitrary order comparisons have been tabulated. The difference between the first and the third and fourth is but slightly less.

The second and third columns show that comparison of sequence on the two different bases made but a slight difference. With the same method of comparison the variation was almost the same. The fact that the 5 topics have been omitted in the comparison makes no difference in the results, since the mean variation for the 13 listed would be the same, whether the remaining five were listed or not, because the variations are computed from an average of the whole table as Sackett gives it. There has been no change in that respect. The 5 have been left out only because there is no basis

for their comparison in the present study. The method of comparison seems to be a fair one.

Looking once more at Table D it is evident, then, that the variation in sequence of topics in the general psychology text-books most widely used in America is not as great as Sackett's study would indicate. A variation of 1.4 on the average is not surprising, and because its leading text-books contain such a variation is no reason either for dismay on the part of psychologists or for attack from without. We are all aware that the general text-books in the old and established sciences such as physics, chemistry, and biology, are by no means uniform in their sequential arrangement of topics, and we never hear those subjects attacked on account of such a variation. The fact that an author may consider one subject more important than another and arrange his order accordingly is no cause for wonderment, especially when a review of six texts shows a variation averaging only 1.4. A careful examination of the tables, especially table A, will show that what variation exists is nothing more than might be expected, and does not indicate any great uncertainty regarding the sequence of topics. For instance, attention, association, and memory may be interchanged as to order, yet they are usually together in some order, almost always with memory third. The difference in sequence of attention and association, since they are closely related, can be small cause for alarm. This is only a typical instance. Others will be noticed.

Altogether it seems that the lack of uniformity in the minds of the six text-book writers is not great enough to admit of any charge of disorganization or wide disagreement on fundamental grounds. Rather it appears that there is sufficient agreement to give real grounds for satisfaction.

After having made a study of the six text-books above mentioned, three other American texts were examined, together with four by foreign authors, viz., Yerkes, Dunlap, and Thorndike; and Kulpe, Ebbinghaus, Stout, and Hoffding from other countries. (8 to 14)

The order of topics in these seven psychology text-books was worked out in the same manner as in the former six, and the mean variation found. An inspection of Table E will show that there is a slightly greater mean variation than was shown in the six books first studied. It is not, however, as great as that shown in the tables arranged by Sackett.

Following the preparation of this comparison, the mean variation for the 13 texts taken together was found, and the results tabulated in Table F. The results show a slightly greater average mean variation than that for either A or F. A shows the lowest average of the three. All averaging below 2, the highest being the average M. V. for the 13 texts, which is 1.8. An examination of the Tables A and E will show that there seems to be a natural line of division between the sequence of the first and second tables. The first six tend to agree generally among themselves, and to more widely disagree with the order in the latter seven, while the order within the latter seems to be more uniform. The average M. V. for the total is not, however, sufficiently great to point to any glaring lack of uniformity even in the broad field of possible textbooks.

Even a M. V. of 1.8 does not indicate any disastrous condition of disagreement, and the M. V. of Table A, which is 1.4 is still less alarming. The results of both A. and E., whether taken separately or together, show a much smaller M. V. than do Sackett's arrangement of

topics, and on the whole the results are favorable to psychology rather than otherwise.

The returns reported by Professor Sackett certainly indicate a wide disagreement among the teachers of psychology regarding the order in which the various topics of the subject should be presented. However, the fact that there is so comparatively small disagreement among the writers of the texts which are used in psychology, would seem to indicate that the lack of agreement among the leading psychologists is not as great as it would seem at first sight. We may, then, fairly conclude that from the standpoint of elementary textbooks, at least, psychology, although lacking in any exact agreement, is no more hopelessly disorganized than its kindred and far older sciences; in fact that its elementary texts do possess sufficient unity and agreement to render invalid any criticism of psychology as possessing texts which are sadly or hopelessly lacking in uniformity. True, each author has introduced new and original ideas of his own, which are embodied usually in special chapters, but as long as there is agreement on the great, outstanding topics of the field there can be no cause for criticism.

- (1) Sackett, L. W.; *The Sequence of Topics in Beginners' Psychologies*, Psych. Bul.; 1915; 12; 89-99.
- (2) Angell, J. R.; *Psychology*; Holt and Co.; N. Y.; 1910.
- (3) Breese, B. B.; *Psychology*; Scribners; N. Y.; 1917.
- (4) James, W.; *Psychology*; Briefer Course; Holt and Co.; 1892.
- (5) Judd, C. H.; *Psychology*; Ginn and Co.; Boston; 1917.
- (6) Pillsbury, W. B.; *The Fundamentals of Psychology*; Macmillan; N. Y.; 1916.
- (7) Titchener, E. B.; *A Textbook of Psychology*; Macmillan; 1910.
- (8) Dunlap, Knight; *A System of Psychology*; Scribners; N. Y.; 1917.
- (9) Ebbinghaus, Hermann; *Psychology*; Trans. by M. Meyer; Heath & Co.; 1908.

- (10) Hoffding, Harald; *Outlines of Psychology*; Trans. by Mary Lowndes; Macmillan; N. Y.; 1904.
- (11) Kulpe, Oswald; *Outlines of Psychology*; Trans. by E. B. Titchener; Macmillan; N. Y.; 1901.
- (12) Stout, G. F.; *A Manual of Psychology*; Hinds, Noble and Eldridge; N. Y.; 1899.
- (13) Thorndike, E. L.; *The Elements of Psychology*; A. G. Seiler; N. Y.; 1905.
- (14) Yerkes, R. M.; Holt and Co.; N. Y.; 1911.

TABLE F

	Grand Total A and F	Grand Total Mean Variation A and F	Average	Mean Variation A and F	Mean Variation of A	Mean Variation F
Sensation .....	26	12	2.0	.9	1.1	.8
Nervous System .....	16	10	1.6	1.0	.3	2.2
Habit ..	55	27.1	6.1	3.0	2.8	2.4
Self ..	100	22	10	2.2	2.8	1.2
Attention .....	63	24.2	4.8	1.7	1.2	1.7
Association ..	74	22	6.1	1.8	1.7	1.8
Memory ..	75	23.3	5.7	1.7	1.0	2.0
Imagination .....	81	31.2	6.2	2.4	1.2	2.7
Perception ..	68	19.2	5.2	1.5	1.5	1.4
Reasoning ..	85	7.2	9.4	.8	.7	.9
Feeling ..	89	35.8	6.8	2.7	2.1	1.5
Instinct ..	77	17.5	8.5	1.9	1.2	1.9
Will ..	124	32	10	2.6	1.5	2.5
Average M. V. ....				1.8	1.4	1.7



TABLE E

	Verbs	Participles	The infinitive	Nouns	Adjectives	Prepositions	Stops	Interjections	Total	Average	Mean Variation
Sensation	1 ( . 7 )	1 ( . 7 )	1 ( . 7 )	1 ( . 7 )		2 ( . 3 )	1 ( 2 . 3 )	2 ( . 3 )	12 ( 5 . 7 )	1 . 7	2 . 2
Nervous System		×	7 ( 4 . 5 )	×	×	1 ( 1 . 5 )	1 ( 1 . 5 )	1 ( 1 . 5 )	10 ( 9 . )	2 . 5	2 . 2
Habit	9 ( 1 . 8 )	9 ( 1 . 8 )	9 ( 1 . 8 )	×		×	3 ( 1 . 2 )		30 ( 9 . 6 )	3 . 2	2 . 1
Self	×	10 ( 1 . )		9 ( . 0 )	10 ( 1 . )	10 ( 1 . )	10 ( 1 . )	6 ( 3 . )	15 ( 6 . )	9 . 0	1 . 2
Attention	6 ( . 0 )	11 ( 5 . )	6 ( . 0 )	7 ( 1 . )	6 ( . 0 )	2 ( 1 . )	2 ( 1 . )	1 ( 2 . )	12 ( 12 . )	6 . 0	1 . 7
Association	7 ( . 1 )	1 ( 2 . 6 )	10 ( 3 . 1 )	4 ( 2 . 6 )	×	×	7 ( . 1 )	8 ( 1 . 1 )	10 ( 10 . 8 )	6 . 6	1 . 8
Memory	4 ( 1 . )	3 ( 2 . )	1 ( 1 . )	2 ( 3 . )	7 ( 2 . )	7 ( 2 . )	8 ( 3 . )	7 ( 2 . )	35 ( 14 . )	5 . 0	2 . 0
Imagination	5 ( . 1 )	2 ( 3 . 1 )	3 ( 2 . 1 )	3 ( 2 . 1 )	3 ( 2 . 1 )	3 ( 2 . 1 )	11 ( 5 . 9 )	9 ( 3 . 9 )	50 ( 19 . 3 )	5 . 1	2 . 7
Perception	3 ( 2 . )	5 ( . 0 )	2 ( 3 . )	6 ( 1 . )	8 ( 3 . )	8 ( 3 . )	6 ( . 1 )	5 ( . 0 )	35 ( 10 . )	5 . 0	1 . 1
Reasoning	×	×	11 ( 1 . 1 )	×	9 ( . 6 )	9 ( . 6 )	9 ( . 6 )	×	29 ( 2 . 6 )	9 . 6	2 . 2
Feeling	2 ( 3 . 3 )	6 ( . 7 )	5 ( . 3 )	5 ( . 2 )	1 ( 1 . 3 )	1 ( 1 . 3 )	5 ( . 3 )	10 ( 1 . 7 )	37 ( 10 . 9 )	5 . 2	1 . 5
Instinct	8 ( 1 . 3 )	8 ( 1 . 3 )	8 ( 1 . 3 )	×	×	×	×	3 ( 3 . 7 )	27 ( 7 . 6 )	6 . 5	1 . 9
Will	×	7 ( 2 . 1 )	12 ( 2 . 9 )	8 ( 1 . 1 )	5 ( 1 . 1 )	5 ( 1 . 1 )	12 ( 2 . 9 )	11 ( 1 . 9 )	55 ( 15 . )	9 . 1	2 . 5

## GAMMA AND DELTA PSYCHOLOGY TESTS.

It is probably recognized by all teachers of general psychology, as in most other subjects, that the ordinary type of final examination in the subject must of necessity fail to cover the ground of the year's work in any very thorough manner. Lack of time usually forbids a comprehensive survey which would test the actual knowledge of the student. The teacher can ask from five to ten questions, the answers to which may be written within the hour, and the student is largely graded on the way in which he handles those particular questions. Such questions must, in the very nature of the examination, be unconnected and isolated, selected from different parts of the field, and having no coherence or unity. It is evident on its face that this is neither a fair nor a thorough test of knowledge, considered from the standpoint of either teacher or student. In this manner it may be learned in how far the student has mastered the terminology and general comprehension of the field, and in how far he is able to apply his knowledge, provided the questions are such as to bring this out, which is rare, but it is hardly a good test of breadth of general information in his field, without which little of real worth can be accomplished.

During the past winter, 1919, the Alpha Mental Test, prepared by the government for mental testing of officers and men, was given to the faculty and student body of Colorado College, by Dr J. V. Breitwieser, head of the Department of Psychology. The Alpha Test is a test of general information, requiring good control of voluntary attention, rapidity of mental action, and general alertness, in order to finish the test in the specified time. None except the best students are able to do it. This Alpha Mental Test suggested the possibility of

the preparation of a similar test for general psychology, one which would give a fair evaluation of the student's breadth of information in the field, requiring mental alertness as well as exact knowledge, and one that could be completed in one, or the most, in two hours. It is with this end in view that the *Psychology Tests* at the end of the chapter have been prepared.

The *Gamma* test is modeled on the plan of the "false definition" test used by F. M. Gerlach in his studies of vocabularies. (1)

In this the general plan is to make a partial statement with four possible completions of it listed below as a, b, c, and d. Only one of these possible completions is right. There are 100 of these questions, and since all that is required of the student taking the test is to check, or otherwise indicate the right one of the four alternative presented, the complete 100 can be answered in a short time, provided the student possesses the requisite knowledge. The false alternatives are so arranged that it will be exceedingly difficult for a person not having the exact information to make a successful guess. The correct alternatives are not arranged in any definite order, but are placed in a chance sequence, so that no clue to the right one can be obtained from the order in which it tends to occur. Furthermore, it is so arranged that it can be quickly and easily corrected by means of a stencil.

The material of the test is such that, although only detailed information is directly tested, nevertheless a thorough acquaintance with the topic in question is required for a correct answer of the details. This is very well demonstrated in Question 5, which is the first one under the heading 'Nervous Ssystem.' It is stated 'The fundamental elements of the nervous system are a.

spinal ganglia, b. Synapses, c. Neurones, d. Myelinated sheaths." It will be noticed that the four alternatives given are all essential parts of the nervous system, yet the neurone is *the* fundamental element. It will demand more than a cursory knowledge to detect the right one of the four. All of the alternatives have been chosen with that end in view; viz., in such a way that no one without knowing the subject will be able to gain a creditable showing in the test. The material upon which the questions have been based has been chosen with a view to selecting that which is most generally included in a thorough course in general psychology. In preparing them it has been the attempt to avoid touching upon controversial ground, and only that has been included on which psychologists agree with comparative uniformity. The four possible completions have in every case been made short and definite. The statement at the beginning has likewise been made as short as possible and still make the meaning clear. It is believed that this brevity will enable a student taking the test to grasp the original statement and the four alternative answers in a brief glance, and if he has the requisite information only a short time need be taken with each one.

The second or *Delta* test is likewise composed of 100 questions, but this time the method of true and false statement has been used. It is not claimed for this that it covers entirely different ground from that covered by the *Gamma* test. In fact it has been intended to touch on many of the same fundamental points. The method of statement and much of the information required in it, however, are entirely different from that of the first test. The method of the *Delta* test may be indicated by giving here two of the statements, one of them being right and the other wrong. Questions 5 and 6 are given.

5. Psychology assumes that all conscious states are dependent on the nervous system. 6. The synapse is the primary element of the nervous system. Only a student familiar with the psychological background of psychology can tell immediately that the first is true and the second false. The true and false statement have been arranged, like the four alternatives in the *Gamma* test, with no definite order, but in an entirely chance sequence, so that no indication of the truth or falsity of the statements is given from the order in which they are arranged. Like the preceding one, this aims to avoid controversial ground, and to deal only with the more fundamental facts of psychology as it is treated in the leading texts.

It is recognized that it would be impossible to satisfy all, or even a majority of teachers, regarding the number of test questions given to the different topics of psychology, since in the minds of different individuals widely differing opinions may be held regarding the relative importance of topics. But in an effort to arrive at some working basis an analysis has been made of six of the leading texts, in order to determine how much space has been devoted by each writer to the main topics of the subject. The books have been those of James, Titchener, Pillsbury, Judd, Angell, and Breese. These have been selected, because of the fact, which has been noted before, that these six books ranked highest in point of use among the 101 schools that replied to the questionnaire. (1, 2, 3, 4, 5)

The table just preceding the two psychology tests shows on what basis this analysis has been made; the number of pages given to each topic by each of the six psychologists; the total number given by all to each topic; what percentage each one comprises of the grand total,



and the consequent number of questions assigned to each. In this table of space devoted to topics, the number of pages given to each one means the actual number of pages of subject matter, regardless of notes or bibliography, when such have been appended covering any considerable amount of space.

The thirteen topics listed have been chosen for practically the same reasons that governed the choice of topics in the preceding discussion of "Sequence of Topics." They are the ones that have been most generally and consistently dealt with by the six psychologists whose textbooks are most widely used.

The introductory pages have been noted and questions proportionately arranged, because in the introduction the writers usually indicate the nature, method, and data of psychology, and it is necessary in a list of questions aiming at anything like thoroughness to include material on this subject. Since there is so definite a demarcation within the field of sensation, the space devoted to each of the five special senses and to organic sensations has been listed separately, in order that the proportionate number of questions could be more fairly given to each. The general discussion of sensation has also been given separately. Then follow the eleven other topics to which the text writers have devoted the major portions of their books, viz.: habit, attention, reasoning, association, memory, imagination, perception, feeling instinct, will, and self. It is obviously impossible to list all of the subtopics dealt with by the different writers. The effort has been to take only the main ones. Personal deviations of nomenclature and treatment have not been dealt with, unless such have been very extended and of a

nature which allowed of their being included under one of the other major topics.

It has, of course, been difficult in many cases to determine the exact amount of space given to each definite topic in certain instances, especially where the treatment of two topics has been carried on in the same discussion. The general plan by which the selection has been made can best be made clear by citing a few examples. In James' *Briefer Course* the chapter on "Some General Conditions of Neural Activity," in which he deals mainly with the foundation of association, has been counted under the head of Association. The chapter on "The Stream of Consciousness," in which James has mingled association, attention, and thought, has been omitted on the ground that the pages dealing with each separate topic could not be dissected out without doing violence to the context. Likewise the short three page chapter on "Consciousness and Movement" has been omitted, as has the epilogue on "Psychology and Philosophy." Conception and Discrimination have been counted under the general head of Reasoning. "The Sense of Time" has been placed under Perception. His chapter on "Sensation and Motion" has been placed under Organic Sensation.

Somewhat greater difficulty has been experienced in dealing with the other five authors. For instance, in Pillsbury, habit, association, and to some extent memory are treated under "The Laws of Centrally Aroused Sensations". Association is also treated under Attention. Titchener discusses the nervous system, when he mentions it at all, under the head of sensation. He places instinct with action and the self with thought. In Judd's chapter on "Voluntary action and Voluntary Attention" the discussion of action and attention is so

interchangeable and interlocked throughout that it has been difficult to assign space to either. The chapter has been divided and 7 pages classed as will and 6 pages under attention. Two more pages have been added to attention from the chapter on "Certain Fundamental Attitudes". In discussion of "Imagination and the Formation of Concepts" both reasoning and imagination are discussed, and again the space has been divided. Likewise three pages on association in the chapter on "Memory and Ideas" have been separated out. In some instances, also, it has been difficult to determine the exact space since some discussions have been begun, broken off, and taken up again at another point in the book. All the chapters dealing with such topics as mental hygiene, attitudes, classification of processes, and the like have been omitted, unless enough definite discussion of a main topic was given to warrant including some of the pages. The above explanation is not intended for an exhaustive description of the way in which all the space has been tabulated, nor of what portions of the books it has been judged best to omit, but it will serve to indicate the plan which has been followed. The sum of the pages tabulated for any one author is not intended to equal the total pages in his book, since introductions or chapters which do not readily come under any of the main general topics have been omitted. The main purpose has been to get an accurate estimate of the average amount of space devoted by the six writers to the main topics in General Psychology. The method must of necessity leave room for slight inaccuracies. The number of pages has been made the basis, and the pages and type of the six texts are not entirely uniform. However, the majority are printed in 12mo. and while type may differ by a few points, the difference for the purpose of this study is

not great enough to vitiate the results. There may be some difference of opinion regarding the space that should be assigned to some topics, but the effort has been made to do this as fairly as possible, and should there be disagreement in the matter of a few pages, the relative number of questions would hardly be changed appreciably by the addition or subtraction of a few pages from space tabulated for any topic.

The pages given by the six psychologists to each main subject have been added and their percentage of the grand total of pages found. The percentage indicates the relative number of questions that should be given to each topic. This method of determining the number of questions in the test of 100 that should be given each subject is at least proportionate to the average importance attached to it by the authors investigated, and since the tests aim to cover the general field, it is believed that this is the best way to determine the relative number of questions. The number given to each topic in both the *Gamma* and *Delta* tests has been found in this way. At best only a method can be suggested here and its practical application shown. In case of a greater number of questions being thought necessary for any topic they could be easily written.

A part of the questions in the *Gamma* test have been given by Dr. Breitwieser in the form of a final examination to his General Psychology class. The results showed that it was a thorough test of their knowledge, and that no one without a definite knowledge of the subject could do anything with the test.

It is recognized that these tests are tests only for information, and in some respects detailed information, and it is only as such that they are claimed to be valuable. It would be difficult to give examinations in ap-

plied psychology or on more theroretical problems in such a way. It is as a test for information in psychology that they have been devised and the method suggested. At the present time many colleges and universities are requiring entrance examinations for all students who enter, regardless of whether or not they come from accerdited high schools. The method of these tests might be used for such entrance examinations in some subjects. In cases where students must pass preliminary examinations before being admitted to candidacy for advanced degrees in psychology, such a test would afford a good method for finding out their acquaintance with the field of psychology. It is probably in the class room or in such an examination as has been last mentioned that these will prove most valuable. They are suggested here as a practical and readily usable method for finding out what definite knowledge a student possesses of the field of general psychology. They are likewise valuable for the individual student who wishes to test the accuracy of his knowledge. The author hopes to make a more complete test of their value in a further study.

- (1) Gerlach, F. M.; Vocabulary Studies; Colorado Springs; Lab. Test Sheet A; 81.
- (2) Angell, J. R.; Psychology; Holt and Co.; N. Y.; 1910.
- (3) Breese, R. B.; Psychology; Scribners; N. Y.; 1917.
- (4) James, W.; Psychology; Briefer Course; Holt and Co.; N. Y.; 1892.
- (5) Judd, C. H.; Psychology; Ginn and Co.; Boston; 1917.
- (6) Pillsbury, W. B.; The Fundamentals of Psychology; Macmillan; 1910.



Space Table	James	Titchener	Pillsbury	Judd	Angell	Deese	Total	Space Proportion	Number of Questions
Introductory ..	8	41	14	13	12	19	107	.42	4
Nervous System ..	42	×	83	47	46	32	250	.98	10
Sensation General ..	19	30	11	4	9	23	96	.37	4
Vision ..	19	34	47	26	12	30	168	.66	7
Audition ..	13	20	26	16	7	21	103	.40	4
Olfactory ..	×	14	5	3	3	6	31	.12	1
Gustatory ..	×	13	7	3	2	7	32	.12	1
Cutaneous ..	10	17	14	3	5	11	60	.24	2
Organic ..	8	33	8	1	3	7	60	.24	2
Habit ..	17	×	2	9	14	2	44	.17	2
Attention ..	23	37	29	8	24	34	155	.61	6
Reasoning ..	33	43	33	1	34	57	201	.79	8
Association ..	41	22	20	3	5	22	113	.44	5
Memory ..	15	21	40	8	23	21	128	.50	5
Imagination ..	10	10	2	10	26	16	74	.29	3
Perception ..	46	66	78	33	44	41	308	1.21	12
Feeling ..	18	33	53	14	60	40	218	.85	9
Instinct ..	24	×	23	4	29	2	82	.32	3
Will ..	46	42	34	9	44	13	188	.73	7
Self ..	40	×	25	9	18	30	122	.48	5

Total 100.

The Figures in all except the last two columns refer to number of pages given to the topics.

## GAMMA PSYCHOLOGY TEST.

## INTRODUCTORY

1. Modern Psychology is
  - a. The science of the Soul.
  - b. The description and explanation of states of consciousness.
  - c. The science of Mind.
  - d. The empirical aspect of philosophy.
2. The field of psychology
  - a. Is confined to the study of man.
  - b. Extends to both man and the animals.
  - c. Is limited to reasoning life.
  - d. Is confined to self-conscious experience.
3. The chief method of psychological investigation is
  - a. Observation.
  - b. Classification.
  - c. Speculation.
  - d. Brain dissection.
4. One of the good working definitions of mind is
  - a. That through which the Soul manifests itself.
  - b. Another name for the brain.
  - c. The abstract name for that thing which works through the brain.
  - d. The sum total of conscious states.

## NERVOUS SYSTEM

5. The fundamental elements of the nervous system are
  - a. Spinal ganglia.
  - d. Myelinated sheaths.
  - b. Synapses.
  - c. Neurones.
6. Axones and dendrites are processes of
  - a. The medullary sheath.
  - b. Neurones.
  - c. The spinal cord.
  - d. Synapses.
7. The spinal cord is
  - a. The co-ordinating center for motor concepts.
  - b. The original basis for cortical reflexes.
  - c. A cerebri adjunct of sensation.

- d. The path of connection between the peripheral nerves and the cortical centers.
- 8. The connection between the termination of the axone of one cell and the dendrites of another is called
  - a. Cell union.
  - b. Pons.
  - c. Neurone.
  - d. Synapse.
- 9. The cerebrum functions as
  - a. A center for true cerebri reflexes.
  - b. The highest center of consciousness.
  - c. Only control center for movement.
  - d. A two lobed, vermiculate organ of conscious phenomena.
- 10. The convolution of Broca is immediately related to the function of
  - a. Sight.
  - b. Speech.
  - c. Movement.
  - d. Thought.
- 11. In normal right minded individuals the speech functions are confined to the
  - a. Right hemisphere.
  - b. Fissure of Sylvius.
  - c. Frontal lobe of the right hemisphere.
  - d. Left hemisphere.
- 12. Under normal conditions nerve impulses
  - a. Go only to the cerebellum.
  - b. Are conducted in both directions.
  - c. Are irreversible.
  - d. May be reversed in the cerebrum.
- 13. The fundamental nerve connections in the cerebrum are made only as the result of
  - a. Thought.
  - b. Imagination.
  - c. Sense experience.
  - d. Innate ideas.
- 14. The fissure of Sylvius
  - a. Is the central fissure of the cerebrum.
  - b. Separates the motor from the sensory areas.
  - c. Separates the frontal and temporal lobes of the cerebrum.
  - d. Is the region of greatest thought centralization.

## SENSATION—GENERAL.

15. The character of sensation depends on
  - a. The nature of the external world.
  - b. The introspective power of the individual.
  - c. The nature of the receiving end organ.
  - d. The kind of stimulus applied.
16. The quality of our end organs that enables us to identify the origin of sensation is called
  - a. Local sign.
  - b. Sense discrimination.
  - c. Mental localization.
  - d. Cutaneous sensibility.
17. Sensation is
  - a. A subjective copy of an external fact.
  - b. A mental reaction to an impulse.
  - c. The condition aroused in the receiving organ by an appropriate stimulus.
  - d. The result of mental integration.
18. The fact that the just noticeable increment bears a constant fractional ratio to the absolute intensity of the stimulus is known as
  - a. Listing's law.
  - b. The Helmholtz theory.
  - c. The law of General Intensity.
  - d. Weber's law.

## VISION

19. The human eye developed as
  - a. Part of the brain.
  - b. The other end organs of sense developed.
  - c. A cutaneous specialization.
  - d. A specialization of sensitive, pigmented nerve fibres.
20. The true organs of vision are the
  - a. Concha.
  - b. Retina.
  - c. Fovea.
  - d. Rods and cones.
21. The number of stable colors in Hering's theory are
  - a. 6.
  - b. 3.
  - c. 8.

- d. 4.
- 22. Red-green vision is localized in the
  - a. Retinal periphery.
  - b. Outer zone of the eye.
  - c. Rods.
  - d. Central zone of the retina.
- 23. The sensation of white light is the result of
  - a. Rod vision only.
  - b. The mixture of 6 complementary colors.
  - c. Blending of red and violet.
  - d. Wave lengths too short to produce color.
- 24. The idea that white light is not a mixture of colors, but due to the excitation of a special brightness receptor or white-black substance is the
  - a. Theory of Helmholtz.
  - b. Purkinje phenomena.
  - c. Only explanation of after images.
  - d. Hering theory.
- 25. The blind spot occurs
  - a. In the fovea centralis.
  - b. Where the optic nerve leaves the eye.
  - c. When light is too bright.
  - d. Only in color blind persons.

#### AUDITION

- 26. The cortical center for hearing is in the
  - a. Temporal lobe.
  - b. Frontal lobe.
  - c. Medulla.
  - d. Region of Broca.
- 27. The final medium of vibration in the inner ear is
  - a. Mechanical.
  - b. Air.
  - c. Liquid.
  - d. A combination of the three.
- 28. Overtones are the result of
  - a. Partial vibrations of the vibrating body.
  - b. An imperfect vibrating medium.
  - c. The density of the vibrating body.
  - d. The stimulus causing the vibration.
- 29. According to the theory of Helmholtz one of the following



plays the principal part in the differentiation of tonal qualities—

- a. Cochlear hair cells.
- b. Fibres of the basilar membrane.
- c. Rods of Corti.
- d. Cortical discrimination.

#### OLFACTORY

0. The organs for smell are situated
  - a. In the sides of the nasal cavity.
  - b. At the extreme top of the nasal cavity.
  - c. Just within the nostril.
  - d. Equally distributed over the nasal cavities.

#### GUSTATORY

31. The end organs of taste are
  - a. Papillae.
  - b. The tongue and roof of the mouth.
  - c. The saliva.
  - d. The epiglottis.

#### CUTANEOUS

32. The sensations of warmth, cold, pressure, and pain
  - a. Are received in the skin by a special end organ for each.
  - b. Are localized in the occipital lobe.
  - c. Are all received by a common end organ.
  - d. Produce the organic sense.
33. A cold steel cylinder applied to the skin
  - a. Will stimulate only cold spots.
  - b. Will not be felt by pressure spots.
  - c. May stimulate either warmth, cold, or pressure spots.
  - d. Affects only the nodular sense.

#### ORGANIC

34. . Kinaesthetic sensations have their main localization in the
  - a. Spinal cord.
  - b. Motor organs of the body.
  - c. Skin.
  - d. Combination of all the end organs of sense.
35. Hunger and thirst are largely
  - a. Gustatory sensations.
  - b. A combination of gustatory and olfactory sensations.

- c. Mental states.
- d. Organic sensations.

## HABIT

- 36. When we have a comparatively fixed form of reaction, dependent on previously made pathways in the brain material, and proceeding without the control of consciousness, we call it
  - a. Memory.
  - b. Instinct.
  - c. Habit.
  - d. Emotion.
- 37. The phenomena mentioned above depends on the
  - a. Length of the dendrites in the cerebrum.
  - b. Number of synaptic connections.
  - c. Plasticity of the organic material.
  - d. Innate characteristics of all brain matter.

## ATTENTION

- 38. Focusing on a portion of the field of consciousness to the exclusion of other portions is called
  - a. Discrimination.
  - b. Attention.
  - c. Memory.
  - d. Thought.
- 39. Attention is characteristically
  - a. Selective.
  - b. Teleological.
  - c. Reflex.
  - d. Voluntary.
- 40. Voluntary attention is marked by
  - a. Long duration.
  - b. Unvarying focus.
  - c. Rythmic rise and fall.
  - d. Indivisibility.
- 41. The psychological explanation of inattention is that it is
  - a. A positive state of like attention.
  - b. A willed refusal to attend.
  - c. Attention to some objects other than the one to which the person is said to be inattentive.
  - d. The negative of attention.

42. From the psychological standpoint, attention shifts because
  - a. Other things are strongly demanding adjustment on the part of the organism.
  - b. Of weak will.
  - c. Of laziness.
  - d. Of inferior motor co-ordinations.
43. The physiological explanation of attention is that it is
  - a. A particular path or set of paths made ready for action.
  - b. The openness of any particular synapse.
  - c. Entirely the result of habit.
  - d. Due to the excitation of special attention neurones.

### REASONING

44. Reasoning may be briefly defined as
  - a. Thinking purposively.
  - b. All thinking.
  - c. Abstract thinking.
  - d. Making new mental co-ordinations.
45. The two fundamental elements of reasoning are
  - a. Discrimination and belief.
  - b. Memory and imagination.
  - c. Feeling and conception.
  - d. Conception and judgment.
46. A concept is
  - a. A brain state.
  - b. An abstract idea containing the elements of many particulars.
  - c. A hypothetical mental construction.
  - d. A mental judgment.
47. One of the main functions of reasoning is
  - a. To bring order in to experience.
  - b. To form new habits.
  - c. To aid in motor co-ordinations.
  - d. To enable the philosophers to explain the universe.
48. The syllogism is a method of reasoning used in
  - a. Induction.
  - b. Concrete thinging.
  - c. Formal logic or deduction.
  - d. Modern science.
49. The method of reasoning in modern psychology is
  - a. Deduction.

- b. Speculation.
- c. Induction.
- d. A priori.
- 50. It is generally accepted that we reason or think in terms of
  - a. Mental images.
  - b. Our desires.
  - c. Our hopes.
  - d. Immediate sense data.
- 51. One of the other psychological functions most closely connected to reasoning is
  - a. Association of ideas.
  - b. Perception.
  - c. Imagination.
  - d. Will.

#### ASSOCIATION

- 52. At the physiological basis of the association of ideas lie the
  - a. Elements of the ideas associated.
  - b. Experience of the individual.
  - c. Neurones and nerve connections of the cerebrum.
  - d. Phosphorescence of the cerebral cortex.
- 53. The above, then, amounts to saying that the basis of association is
  - a. Neural.
  - b. Psychical.
  - c. Sensational.
  - d. Ganglionic.
- 54. Associations are like habits except that they
  - a. Are longer in forming.
  - b. Involve less effort.
  - c. Need not result in motor response.
  - d. Are less complicated.
- 55. The fact that to recall an idea we must start from something similar, contiguous, or in contrast to the idea we wish to recall, is known as
  - a. Association.
  - b. Conception.
  - c. Willing.
  - d. Thinking.
- 56. The laws of association assert that
  - a. Reproduction of experience is dependent on previously made synaptic connections.

- b. Past experience is determined by already made synaptic connections.
- c. Association of ideas is dependent on muscular response.
- d. Learning is a habit acquired by life experience.

## MEMORY.

- 57. Impression, retention, recall, and recognition are the four processes which constitute
  - a. Habit.
  - b. Reasoning.
  - c. Imagination.
  - d. Memory.
- 58. In learning, fewer repetitions are required, when they are
  - a. Distributed over different days.
  - b. Grouped in one day.
  - c. Made silently.
  - d. In immediate succession.
- 59. The distinctive element in memory is
  - a. Retention.
  - b. Learning.
  - c. Recognition.
  - d. Recall.
- 60. The physiological basis of memory is
  - a. Previous sense stimuli.
  - b. An innate ability to remember.
  - c. Associative nerve connections in the cerebrum.
  - d. Preparation and training by memory systems.
- 61. Forgetting is most rapid
  - a. A long time after initial learning.
  - b. In the hours immediately following the learning.
  - c. When the individual tries to remember.
  - d. When cortical integration is inversely proportionate to ganglionic flexion.

## IMAGINATION.

- 62. Impression, retention, and recall are the primary elements of
  - a. Memory.
  - b. Belief.
  - c. Imagination.
  - d. Conception.



63. The thing which distinguishes imagination from memory is the absence of the element of
  - a. Reality.
  - b. Interest.
  - c. Consciousness.
  - d. Recognition.
64. The neural basis for memory and imagination is
  - a. Entirely different.
  - b. Exactly the same.
  - c. Partly the same.
  - d. More complicated in imagination.

PERCEPTION

65. The conscious recognition of a thing through the avenue of any of the senses is called
  - a. Perception.
  - b. Sensation.
  - c. Conception.
  - d. Discrimination.
66. Perception is due to
  - a. The sense organs only.
  - b. Peripheral conditions.
  - c. Central recognition of peripheral stimuli.
  - d. Central action only.
67. Perceptions are
  - a. Innate as is in the case of infants.
  - b. Impossible without experience.
  - c. Elements of sensation.
  - d. The result of will.
68. Applying what is known about perception, we find that in reading the unit is the
  - a. Sentence.
  - b. Letter.
  - c. Word.
  - d. Two or more letters taken together.
69. Simple sensations.
  - a. The result of a developed perception.
  - b. Those coming from the less complex of the five senses.
  - c. Peculiar to animals.
  - d. Necessary fictions of psychological science.
70. The essential thing about a perception is

- a. Its reality.
  - b. The possibility of its modification.
  - c. Meaning.
  - d. Its relation to the external world.
71. In space perception one of the following combinations of the senses plays the leading part.
- a. Vision, hearing, touch, kinaesthetic sense.
  - b. Smell, vision, hearing, touch.
  - c. Vision, taste, smell, kinaesthetic sense.
  - d. Hearing, touch, taste, kinaesthetic sense.
72. One of the most important factors in building up a spatial percept is
- a. Feeling.
  - b. Apperceptive connections.
  - c. Movement.
  - d. Reasoning.
73. Perception.
- a. Always mirrors reality exactly.
  - b. Is influenced by accompanying inner and outer conditions.
  - c. Is the same regardless of such conditions.
  - d. Depends on brain action alone.
74. There are two main types of theories to explain illusions. One of these follows—
- a. Central theory.
  - b. Muller-Lyer.
  - c. Bulwer-Lytton.
  - d. Nerve theory.
75. The other is one which holds that the illusions are correct interpretations of sense data that is in itself incorrect (objectively incorrect).
- It is called
- a. Nerve theory.
  - b. Sense complex.
  - c. Peripheral theory.
  - d. Cortical integration theory.
76. One of the following combinations of phenomena plays a significant part in space perception
- a. Shadows and intervening objects.
  - b. Nerve cells and shape of objects.
  - c. Synaptic connections and distance of objects.
  - d. Number of cones in retina and amount of retinal light.

FEELING

77. The subjective conscious states containing attitudes aroused by objects of experience are known as
  - a. Perceptions.
  - b. Feelings.
  - c. Intuitions.
  - d. Thoughts.
78. Feeling is
  - a. Always an attribute of imagination.
  - b. A mental state undetermined by sensation.
  - c. Always accompanied by sensation.
  - d. Identical with sensation.
79. The result of psychological analysis show that
  - a. There are four main types of feeling.
  - b. Feelings are always five dimensional.
  - c. There is no feeling without thought.
  - d. There may be almost any number of feelings.
80. Two of the most generally recognized forms or "tones" under which feelings are classified are
  - a. Goodness, badness.
  - b. ..Intense, less intense.
  - c. Peripheral, central.
  - d. Pleasantness, unpleasantness.
81. Feeling content is determined by the
  - a. Feeling itself.
  - b. Accompanying sensation.
  - c. Related ideating activity.
  - d. Unspecialized neurones of the cortex.
82. An emotion is
  - a. An aesthetic feeling.
  - b. An intensified, specialized feeling.
  - c. A strong sensory sentiment.
  - d. Another name for passion.
83. The general physiological conditions of emotion are
  - a. Immediate brain states.
  - b. Past and present condition of nervous system; present stimulation running to and from the brain; and general somatic conditions.
  - c. Number of sentimental reflexes.
  - d. The affective sentiments acting through the spinal ganglia.

84. According to the James-Lange theory of emotion
- The bodily changes follow directly the perception of the exciting fact. The feeling of the changes as they occur is the emotion.
  - The emotion is first experienced. The bodily changes follow the central experience.
  - The procedure varies with the emotion; now one coming first, now the other.
  - Central experience and bodily changes contribute equally to form emotion.
85. Emotions are
- Closely related to other mental processes.
  - Dependent wholly on peripheral stimulation.
  - Entirely independent of other mental states.
  - Uninfluenced by ideas.

#### INSTINCT.

86. An inherited combination of reflexes, integrated by the central nervous system and resulting in external action is called
- Habit.
  - Instinct.
  - Genius.
  - Apperception.
87. The basis of all instinct lies in the
- Neutral mechanism.
  - Self as separate from the brain.
  - Spinal cord.
  - Cerebellum.
88. The instincts of the average individual are the result of
- A selective process operative in the race.
  - Having a highly developed series of reflexes in the lower cord.
  - Comparatively undeveloped intelligence.
  - A lack of inhibitory ideas.

#### WILL

89. The volitional action usually called will is fundamentally
- Reflex.
  - Automatic.
  - A resultant of experience.
  - Instinctive.
90. Psychologically, choice consists in

- a. Bringing one intention into focus, while inhibiting others
  - b. A will act of the self entity.
  - c. Memory and imagination.
  - d. Desire and purpose.
91. Volition is
- a. Strictly a physical fact.
  - b. Always followed by action of some kind.
  - c. A purely mental fact.
  - d. Undetermined by any other mental factors.
92. The real bases of will are
- a. Physical.
  - b. Peripheral.
  - c. Reflex.
  - d. Idea-motor.
93. In the light of the above answer will is a phenomenon which is essentially
- a. Motor.
  - b. Central.
  - c. Ganglionic.
  - d. Unconscious.
94. The primary act of will is
- a. Effort of attention.
  - b. Neural excitation.
  - c. Motor stimulation.
  - d. An habitual reaction.
95. The only real resistance that the will can encounter is
- a. The central resistance offered to the idea with which the volition is immediately concerned.
  - b. The neural resistance in the efferent nerves.
  - c. The resistance offered in the muscles.
  - d. That offered by external conditions.

#### SELF

96. The idea of self is (scientifically)
- a. An innate idea.
  - b. A reasoned judgment.
  - c. A concept maturing with experience.
  - d. The result of education.
97. For scientific psychology the self is
- a. A philosophical entity.
  - b. A conscious entity with laws of organized life.



- c. That which has ideas.
- d. That thing which expresses itself through the mind.
- 98. The distinguishing mark of the normal self is
  - a. Imagination.
  - b. Thought.
  - c. Unity.
  - d. Sensation.
- 99. From the scientific viewpoint, if there existed no material body,
  - a. The self would still exist.
  - b. There would still be consciousness.
  - c. There could be no self as we know it.
  - d. The self would function, but in a different manner.
- 100. The abnormal condition known as dissociation of personality, or divided self, is fundamentally based on
  - a. Spiritual conditions.
  - b. Spiritual disintegration.
  - c. The indecision of conscience.
  - d. Physiological brain conditions.

DELTA PSYCHOLOGY TEST.  
RIGHT AND WRONG STATEMENTS

INTRODUCTORY

- 1. Psychology is concerned primarily with a study of the human consciousness.
- 2. What the ultimate nature of consciousness is, psychology does not know.
- 3. The mind is an entity which thinks by means of the brain, but is separate from it.
- 4. Introspection is the laboratory method of psychology.

NERVOUS SYSTEM

- 5. Psychology assumes that all conscious states are dependent on the nervous system.
- 6. The synapse is the primary element of the nervous system.
- 7. A protoplasmic cell body, an axone and dendrites are the elements forming a neurone.
- 8. The following are the distinguishing marks of a dendrite: smooth, regular and of constant diameter throughout its

course; terminal arborization; collaterals branching at right angles.

9. When the terminations of an axone and a dendrite unite, the union is called a synapse.
10. An immediate reaction to stimulus without the intervention of consciousness is called a reflex.
11. The cerebrum is the highest center of consciousness.
12. Under normal conditions a nerve impulse will travel in either direction across a synapse.
13. The fissure of Rolando is the central fissure of the cerebrum.
14. The convolution of Wernicke is the motor speech center.

#### SENSATION—GENERAL

15. The kind of stimulus applied determines the kind of sensation received by the central nervous system.
16. Extensity, intensity, and duration are the three main qualities of sensation.
17. By local sign is meant the ability of the receiving central nervous system to interpret the objective nature of the stimulus applied.
18. In the process of evolution the skin with its sensations was probably the first sense organ to develop.

#### VISION

19. The human eye developed as a part of the brain grown outward toward the surface.
20. The retinal fovea is the true organ of vision.
21. There are four distinct color areas on the normal retina, corresponding to the four stable colors, blue, yellow, red, and green.
22. All vision is dependent on the amount of visual purple in the rods.
2. According to the Helmholtz theory there are four elementary color sensations and two colorless sensations, each pair being produced by antagonistic photochemical processes in the retina.
24. The blue and yellow retinal areas were the last to develop, and as a result they occupy the center of the retina.
25. A red-blind individual will be also green-blind; in other words, blindness to one color means blindness to its complement.

## AUDITION

26. The auditory sensations are the most complex of all the sensations.
27. According to the Hering theory, the cochlear hair cells are fundamental in the transmission of vibrations to the auditory nerve.
28. The "sympathetic vibration" theory is the theory of Helmholtz.
29. The cortical center for hearing is in the temporal lobe of the cerebrum.

## OLFACTORY

30. The olfactory sense is less easily fatigued than any other of the sense organs.

## GUSTATORY

31. The sensations of taste and smell are so closely related that we rarely ever experience the quality of taste without accompanying olfactory sensations, whether consciously noted or not.

## CUTANEOUS

32. The discrimination of two points on the skin is determined by the system of local signs alone.
33. There are special end organs in the skin for warmth, cold, pressure, and pain.

## ORGANIC AND KINAESTHETIC

34. Equilibrium or the static sense is closely related to the organs of the inner ear.
35. Hunger and thirst are simply mental states.

## ATTENTION

36. Attention is always a conscious focusing on one element of the field of consciousness.
37. Attention serves to increase the subjective intensity of the sensation attended to.
38. In common with other mental phenomena, attention is subject to the law of change, and tends to shift constantly.
39. Consciousness always accompanies attention.

40. One striking characteristic of attention is that it is selective.
41. The qualities of attention are dependent on many factors, such as interest, heredity, past history of the individual and the like.

#### HABIT

42. Habit formation means an increasing openness of the synaptic paths concerned. The physiological principle involved is that nerve currents tend to use the pathways previously formed.
43. Habit, of whatever kind must be accompanied in its function by conscious control.

#### REASONING

44. The method of reasoning most used in modern psychology is deduction.
45. Reasoning may be briefly called "purposive thinking."
46. Conception and judgment are the primary elements of reasoning.
47. Valid sensations are the only prerequisites for valid reasoning.
48. A concept is a theoretical mental interpretation of sensation.
49. Inference is the highest type of reasoning.
50. Induction and deduction are the two main forms of logical reasoning.
51. Reasoning is not dependent on other forms of knowledge or of mental function.

#### ASSOCIATION

52. By association we mean the potentiality of arousal of one mental state by another already present in the field of consciousness.
53. Association is primarily psychical; secondary neural.
54. The two main types of association are by similarity and likeness.
55. The physiological basis of association is the formation of cerebral nerve connections.
56. Association is the lowest form of reasoning.

## MEMORY

57. Retention, recall, and recognition are the distinctive elements of memory.
58. The element that differentiates memory from imagination is the element of recall.
59. The memory is a separate faculty of the mind and must be trained accordingly.
60. Without imagination there can be no memory.
61. Memory, in the same way as association and habit, is dependent on the synaptical connections in the cerebrum.

## IMAGINATION

62. Imagination and memory are dependent in the same way on neural connections in the cerebrum.
63. A person must possess a wealth of past experience in order to have a good imagination.
64. The absence of the element of recognition is the thing that distinguishes imagination from memory.

## PERCEPTION

66. In the normal, adult individual there is no such thing as a simple sensation.
67. There can be no perception without conception.
68. There can be no perception without central recognition of the sensation received.
69. Perception, therefore, is made up of peripheral stimulation plus central recognition.
70. It is a well established fact that we perceive space intuitively.
71. The chief value of perception is that it gives an exact copy of the external world.
72. In space perception inherited instincts play the leading part.
73. Four types of sensation contribute chiefly to our perception of space—vision, hearing, touch, kinaesthetic.
74. The best established theory of illusions is the Helmholtz-Hering theory.
75. Eye movement functions largely in building up spatial percepts.
76. All space perceptions are the results of a developed experience with the external world. They are not immediate presentations.



FEELING

77. Feelings may be classified in two main divisions—pleasant and unpleasant.
78. Sensation and feeling have the same meaning from the psychological point of view.
79. The fissure of Rolando bounds the localized feeling areas.
80. Feeling is independent of bodily conditions.
81. Emotion is the result of the reasoning process.
82. An emotion is an intensified, specialized feeling.
83. Emotions are strictly mental states. They have no conditioning psychological factors.
84. The theory that the bodily changes are the emotion and precede central excitation, i. e., we are sad because we weep, not vice versa, is the James-Lange theory of emotions.
85. There is no such thing as an intellectual feeling or emotion.

INSTINCT

86. Instinct is another name for a simple reflex.
87. The instincts that man now has are the result of a selective process in his racial history.
88. An instinct is an inherited combination of reflexes, integrated by the nervous system, and resulting in external action.

WILL

89. What is usually called will, scientifically speaking, is a motor phenomena.
90. Acts of will are always dependent on knowledge and feeling.
92. The will is a mental faculty that can be improved by direct training.
93. The will is a characteristic of the self apart from physiological brain action.
94. Motor stimulation is the fundamental will act.
95. Character is a collection of fixed modes of willing; it is our organized choices becoming habitual.

SELF

96. The idea of self comes only as the product of experience.
97. From the scientific viewpoint the self is a distinct entity finding self expression through the action of brain matter.

98. The normal self is a discontinuous aggregation of separate, unified entities.
99. Psychologically speaking, the self functions through brain matter, but is not dependent on the brain for existence.
100. Dissociated or disunified selves are always physiologically conditioned.



















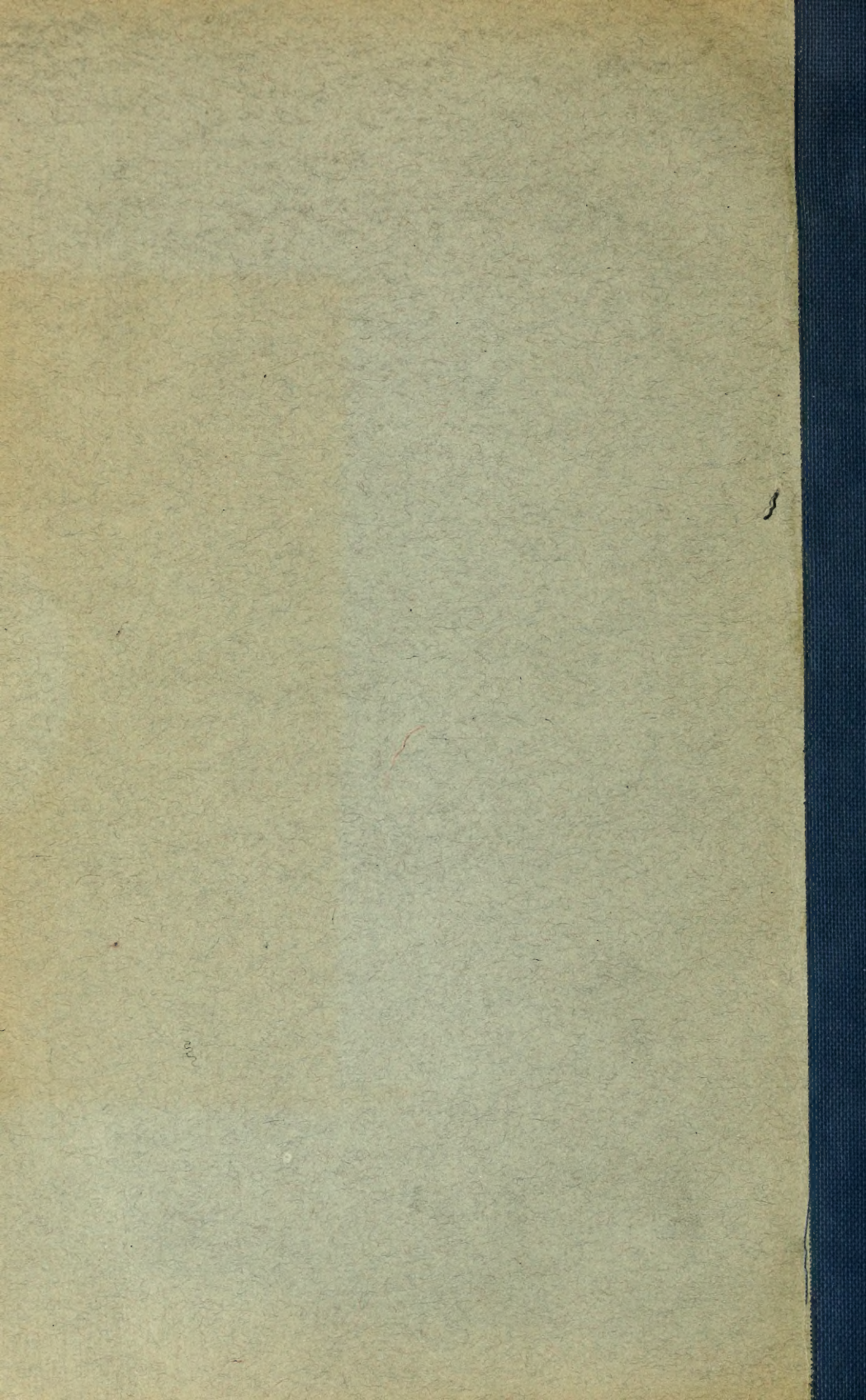
## LANGUAGE SERIES—VOL. II.

- “ 20. Lowell's Conception of Poetry.—*Edward S. Parsons.*
- “ 21. The Church and Education.—*Edward S. Parsons.*
- “ 22. Literature as a Force in Character Building.—*Edward S. Parsons.*
- “ 23. Relation of the Home to the Criminal.—*Edward S. Parsons.*
- “ 24. Jonson and Milton on Shakespeare.—*Edward S. Parsons.*
- “ 25. Rousseau and Wordsworth.—*Homer E. Woodbridge.*
- “ 26. The Supernatural in Hawthorne and Poe.—*Benjamin Mather Woodbridge.*
- “ 27. “Much Ado About Nothing” and Ben Jonson's “The Case is Altered.”—*Homer E. Woodbridge.*
- “ 28. A Note on “Henry V.”—*Homer E. Woodbridge.*
- “ 29. The Pikes Peak Region in Song and Myth.—*Elijah Clarence Hills.*
- “ 30. Some Spanish-American Poets.—*Elijah Clarence Hills.*
- “ 31. The Value of Poetry in the Schools.—*Roger Henwood Motten.*
- “ 32. Matthew Arnold's Poetry—An Appreciation.—*Atherton Noyes.*
- “ 33. St. Severinus and the Province of Noricum.—*Charles C. Mierow.*
- “ 34. European Tales Among the North American Indians.—*Stith Thompson.*

## ENGINEERING SERIES—VOL. I.

- No. 1. The Fusibility and Fluidity of Titaniferous Silicates.—*L. C. Lennox and C. N. Cox, Jr.*
- “ 2. The Design of a Low-Tension Switch-Board.—*Vernon T. Brigham.*
- “ 3. The Roasting of Telluride Ores.—*R. L. Mack and G. H. Seibold.*
- “ 4. Further Notes on the Mammals of Colorado.—*Edward R. Warren.*
- “ 5. The Movement of Light in Crystals.—*George I. Finlay.*
- “ 6. Aaron Palmer's Computing Scale.—*Florian Cajori.*
- “ 7. John E. Fuller's Circular Slide Rules.—*Florian Cajori.*
- “ 8. A Proposed List of Experiments for a Course in Electrical Engineering Laboratory.—*John Mills.*
- “ 9. An Outline of Mineralogy.—*George I. Finlay.*
- “ 10. On the Invention of the Slide Rule.—*Florian Cajori.*
- “ 11. A Study of the Advisability of Electrification of the Arkansas Junction-Basalt Division of the Colorado Midland Railroad.—Abstract by *George B. Thomas.*
- “ 12. Notes on a Graphical Method of Dealing with Water Supply.—*William A. Bartlett.*
- “ 13. The Effect of Altitude on the Heating of Electrical Machines.—*George B. Thomas.*
- “ 14. Field Practice in Surveying.—*Frank M. Okey.*
- “ 15. Shop Courses in Technical Education.—*Nelson R. Love.*
- “ 16. Notes on the Early History of the Slide Rule.—*Florian Cajori.*







P Univ.  
Author Colorado College  
Title Education and psychology series, 1<sup>1</sup>, 1919 C

**University of Toronto  
Library**

**DO NOT  
REMOVE  
THE  
CARD  
FROM  
THIS  
POCKET**

Acme Library Card Pocket  
LOWE-MARTIN CO. LIMITED



